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SEPTEMBER 1992

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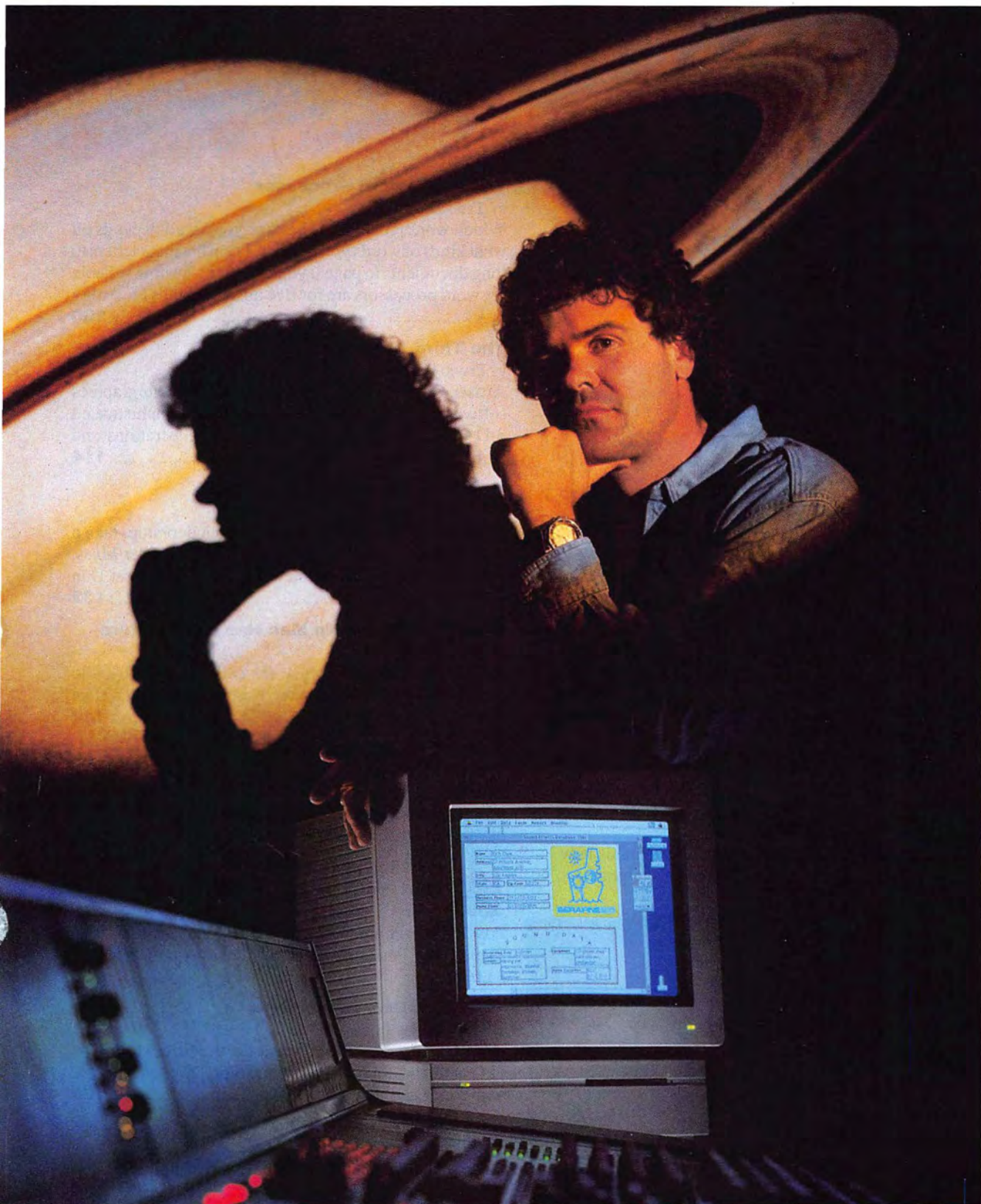
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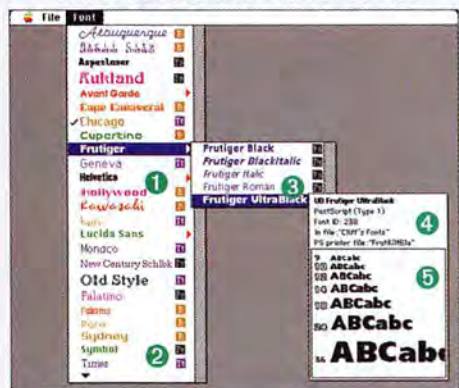
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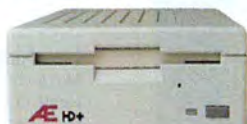


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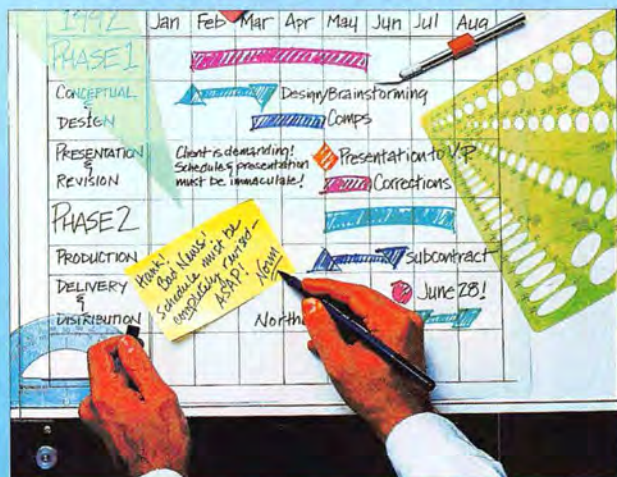
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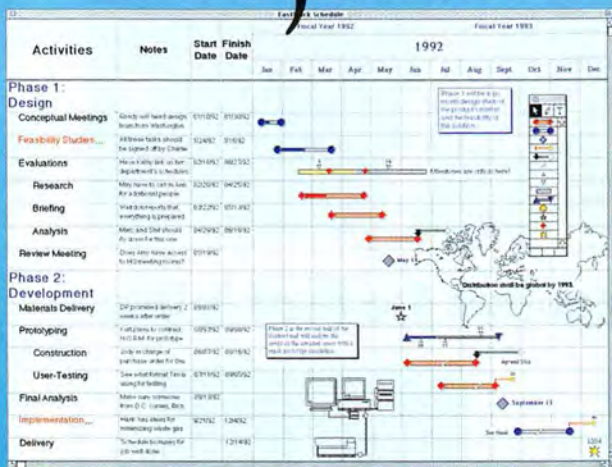
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1956 - 1989
and
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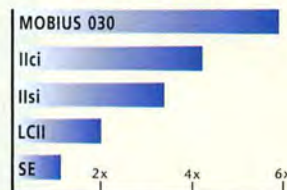


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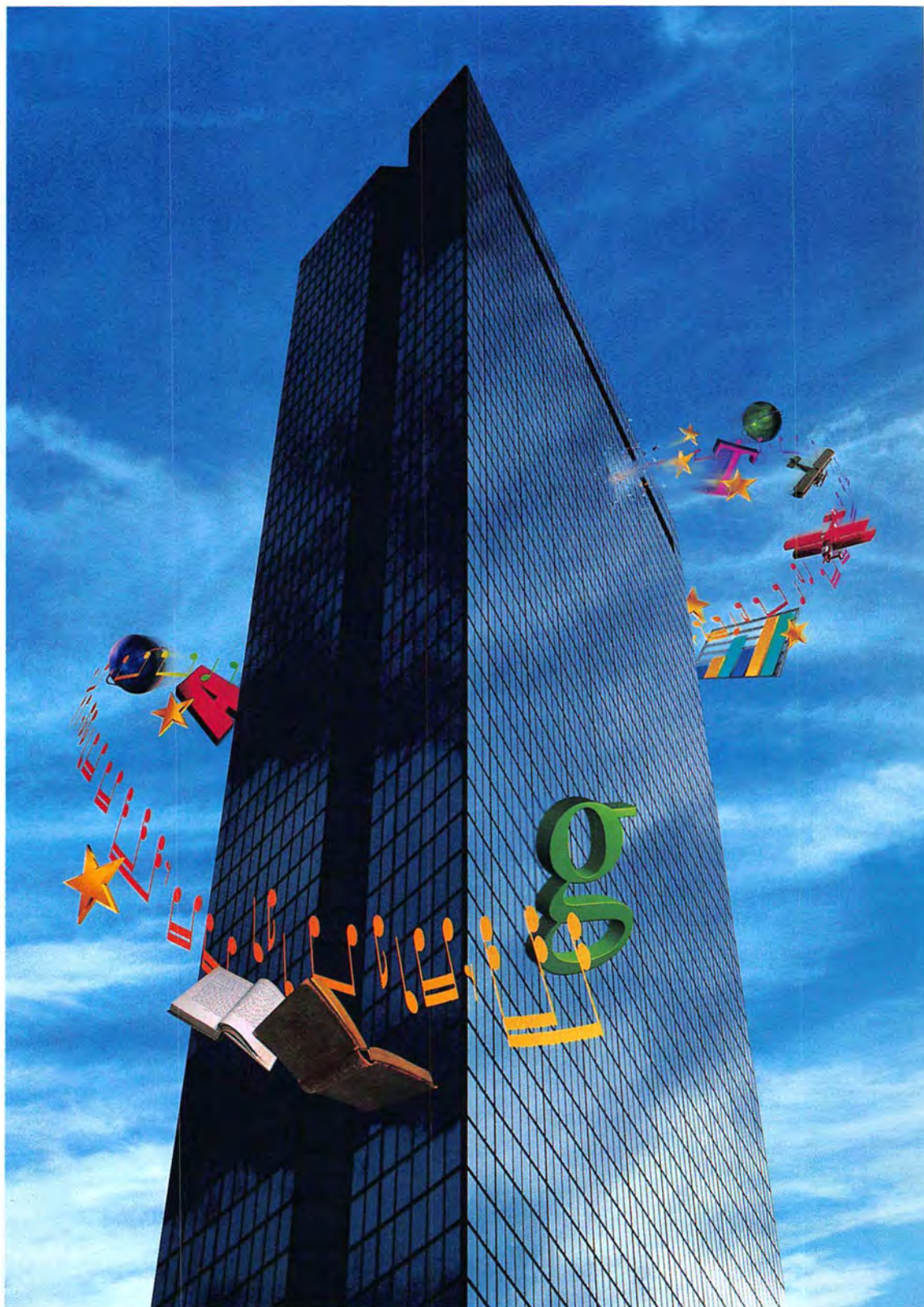
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Steven Bobker, MacUser 6/92



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MacUser

Something Fishy

You may already know *MacUser's* new consumer columnist, Andy Ihnatko, as one of those public-spirited Help Folder guys who risk life, limb, and/or dignity every month just to answer your questions.

"I really get my kicks," says Andy, "when I see a letter that gives me a chance to look like a total idiot. [See photo. — Ed.] When someone asked whether airport X-ray machines hosed data, I had an excuse to badger a Logan International security person into letting me ruin package after package in her machine at 11 P.M. When someone asked how to prevent insects from infiltrating his hardware, I ran out to buy a dozen pairs of panty hose, at almost certain risk to my local reputation, to devise a mosquito-netting scheme."

Andy's biggest challenge so far — or at least his best excuse for hanging out in tropical-fish stores — was his recent conversion of a Mac 512K into a fully functioning aquarium. It all started when a reader casually asked, "What's the best way to upgrade a Mac 512K?" and Andy answered with a throwaway remark about turning it into a fish tank. But when



No question is too tough or too fishy for consumer advocate Andy Ihnatko, who developed a working Macquarium™ after a reader asked what a 512K Mac was still good for.

requests for copies of the plans for the Macquarium™ started pouring in, Andy began a year-long quest to deliver the goods. It says something about Andy — and we're not sure what — that he felt honor-bound to satisfy these requests.

"After taking endless measurements, building prototypes, and sacrificing three fishy lives, I completed the Macquarium™." Andy brags, "Not only is it completely functional but it also makes a handsome addition to any office."

Andy says building your own Macquarium™ will set you back around \$30 — not including the 512K (or comparable-form-factor) Mac. His kit — including directions, patterns, and a complete parts list — is available from ZiffNet/Mac's MacUser Forum (filename MACQUA.SIT) or the Boston Computer Society (617-625-7080).

After this, we felt we had no choice but to make Andy our consumer columnist.

"I see myself as a cross between Darkwing Duck and Poor Richard. Eager as I am to cast the light of truth upon the shirking ooze of malfeasance, I also want to share loads of neat info that's hard to come by elsewhere," Andy explains.

Apparently going on the theory that a consumer columnist should be an expert consumer, Andy bribed us to say that he's desperately seeking an original Apple I. Anyone wanting to unload one — or to fink on someone for the consumer-affairs column — can reach Andy *c/o MacUser* or via E-mail.

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Steven Bobker—MacUser

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LETTERS



David Tannenbaum, of Great Neck, New York, was surprised to see Apple cofounder Steve Wozniak's cameo appearance in a PowerBook ad ("It's the next thing") in the June issue of *MacUser*. "At first I didn't believe it, but then I read the text on Steve's screen: 'When I designed the Apple II . . . How did Apple get him to endorse its product? And is that actually his son?'"

David, perhaps you're thinking of that other Steve (Jobs, that is), who claims to have the NeXT thing. Woz and Apple get along fine, and both he and son Jesse Clark, age 9, are avid users of the PowerBook 170. Proud papa (note the identical smiles) says Jesse is teaching *him* a thing or two about computers these days.

Write to Letters to the Editor, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the *MacUser* Forum of

ZiffNet/Mac, our on-line service. All letters become the property of *MacUser*, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

Practicing Without a License

The opening to "A Mac Color Primer" (May '92, Buyer's Guide page 4) hit a raw nerve. I strongly object to the notion that desktop publishing "is relatively easy these days: Just buy a Mac, a page-layout program, and a laser printer, and you're in business."

As a professional designer and desktop publisher, I've spent six years and thousands of dollars perfecting my craft. Because I work alone, I'm an artist, typographer, editor, and power user all

rolled into one. It's insulting to insinuate that a sales slip from an Apple dealer is a license to get into "the desktop-publishing game."

If you owned a stethoscope, would you call yourself a doctor?

Marcy Poulos
Sparta, MI

Words from the Wise

The letter "Key Words" (June '92, Buyer's Guide page 18) perpetuates the common assumption that Microsoft Word's feature set is the correct one and compares all other products with it. Notice how only Word has all items checked in the features table? The fact that Nisus has numerous features that Word can't touch — including a full graphics layer, contrary to your features listing — or that

WordPerfect deals well with QuickTime and many languages, or that WriteNow can exist in an incredibly small amount of RAM all fall by the wayside when it is assumed that Word is the pinnacle of word-processing prowess.

Adam C. Engst
via ZiffNet/Mac

I disagree with Sharon Zardetto Aker's broadbrush statement that color is a useless feature in word processors. Aker is too narrowly limited to paper; color can often supply an additional dimension of information.

As an attorney, I find that colored text is invaluable not only in writing a long appellate brief but also for identifying and organizing the summary of evidence culled from thousands of pages of testimony. If anything, I need more than the eight colors Microsoft Word provides.

More important, a magazine that's heralding future technology should realize that word processors aren't limited to black-and-white paper output. Readers can view the text on-screen or use a color printer. Then again, each member of a workgroup might edit a document on-screen, using a different color.

Jay R. Giusti
Chicago, IL

Color is very useful for differentiating text that needs further work. That the color doesn't print is a major plus for me, because I can print draft copies without weird formatting

Dear Mr. Sculley ...

In May we asked **whether you had switched to System 7 yet**. The 2-megabyte-plus RAM requirement came in for its share of abuse. Jeffrey Goldader, of Honolulu, Hawaii, complained, "Why does Apple require System 7 on machines that come with only 2 megabytes of RAM? Get real!" He hacked his PowerBook 100 to run System 6.0.7, which uses less than 1 megabyte of memory. But Mike Gondek, of Chicago, Illinois, thinks the memory argument is pretty silly. "Sure System 7 uses more RAM, but you can buy a 1-megabyte SIMM for \$35."

Lee E. Fischer, of Cambridge, Massachusetts, appears to need a reality check. After being frightened away by the Compatibility Checker's report, he says, "Apple should bring System 7 into compatibility with users' existing programs, so that the only expense is for System 7 itself."

But Deborah L. Alpi, of Pacifica, California, is fed up with the whiners. "I'm tired of complaints about System 7 when there are more than a year's worth of articles about it as well as several System 7 books. If you

upgrade programs on a regular basis, cost and compatibility problems are minimal. I'm always appalled when people insist on using ancient versions of applications and then complain when their systems crash.

"System 7 is far more stable than Multi-Finder is under System 6. Memory management is more efficient, especially with System 7 Tune-Up. All those whiners should get themselves a PC. My father bought his six months ago, and he still hasn't installed MS-DOS."

This month, we want you to show us your shelfware — that piece of software (or hardware) you own but never use. Maybe it didn't work as advertised, maybe your company thrust it upon you, or maybe you just outgrew it.

Speak Up:

What products are gathering dust on your shelves, and why?

Send your thoughts to Dear Mr. Sculley, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

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LETTERS

that is distracting to read. I wish THINK Pascal and THINK C supported color so I could use it to denote new code.

Laurence Harris
Chapel Hill, NC

I can think of several reasons why integrated drawing features are useful in a word-processing program. You can create simple graphics, such as organizational charts, without having to open a second application. Applications with built-in drawing tools often have a separate drawing layer, which means that you can not only place graphics in the text but also over, under, and around it.

Most Mac word processors handle imported graphics abominably. WordPerfect for the Mac is an exception. It distinguishes among several types of graphic boxes, allows you to anchor graphics to a page location, and can automatically assign figure numbers and update them (and their captions and cross-references) if you move the art somewhere else. These capabilities are invaluable to technical writers and are lacking in the current versions of Word and MacWrite.

James W. Horswill
Minneapolis, MN

You play up obscure advantages of Word and ignore real strengths of WordPerfect. Consider these overlooked-but-important features:

- Powerful and easy-to-use macros (not in Word 5.0).
- Complete graphics tools. (Some of us don't have \$400 for FreeHand.)
- Compatibility with other platforms. Many businesses mix PCs and Macs, so compatibility is essential.
- QuickTime movies, along with easy-to-change text and background colors, which make WordPerfect a potential presentation program.
- Friendly, toll-free customer support, with a real person answering the phone (try calling Microsoft).

WordPerfect is not without its faults. One feature you didn't discuss is typing speed. There's often a noticeable lag in on-screen text display when I type on my Mac IIx.

Henry F. Domke
New Bloomfield, MO

Contrary to your article, WordPerfect 2.0 does do tables. The Table command is available as a macro that can be run on a full page, creating a table spanning the

width of the page or within a text box. The text box can be resized and anchored to other text, which will wrap around it.

WordPerfect 2.0 also contains an outlining feature, and what you describe as a glossary sounds very similar to WordPerfect's powerful macro capability, which allows me to make stationery and address-label forms and create hanging indents. In light of these revelations from a dedicated, albeit casual, user, it seems that you need to update your features table.

Leland S. Cogan
Lansing, MI

Word 5.0 remains the only word processor with a true Table function. WordPerfect's "tables" are actually specialized columns and there's no concept of cells, so working with WordPerfect pseudotables is much harder than working with tables in Word. And all WordPerfect's "outliner" does is create the look of an outline. You can't collapse headings or reorganize your work by dragging, as you can with a true outline function. If all you want is the appearance of a table or an outline, WordPerfect may be enough, but if you really need to work with those formats, you should use Word. — RI

Printer Mismatch

You misled readers by comparing our tabloid-sized ColorPoint PSX Model 14 with letter-sized printers from other manufacturers ("Thermal-Wax-Transfer Color Printers," May '92, Buyer's Guide page 42). Our letter-sized version, the Model 4, would have been 30 seconds per page faster than the Model 14 in your tests, and the former's \$7,999 price compares very favorably with that of the other rated printers.

Using a single-page presentation file to test performance does not give an adequate indication of throughput for printers in a shared environment. The ColorPoint PSX can download multiple-page files as well as multiple files, freeing up the host faster and making users more productive.

Finally, Tektronix's new Phaser II PXe is *not* a serious competitor to our Personal ColorPoint PS printer. For \$4,999, the Personal ColorPoint PS includes 6 megabytes of RAM and 39 resident fonts. The \$4,995 Phaser II PXe has only 4 megabytes of RAM and 17 resident fonts. The Personal ColorPoint PS also provides SCSI hard-drive support and four-color

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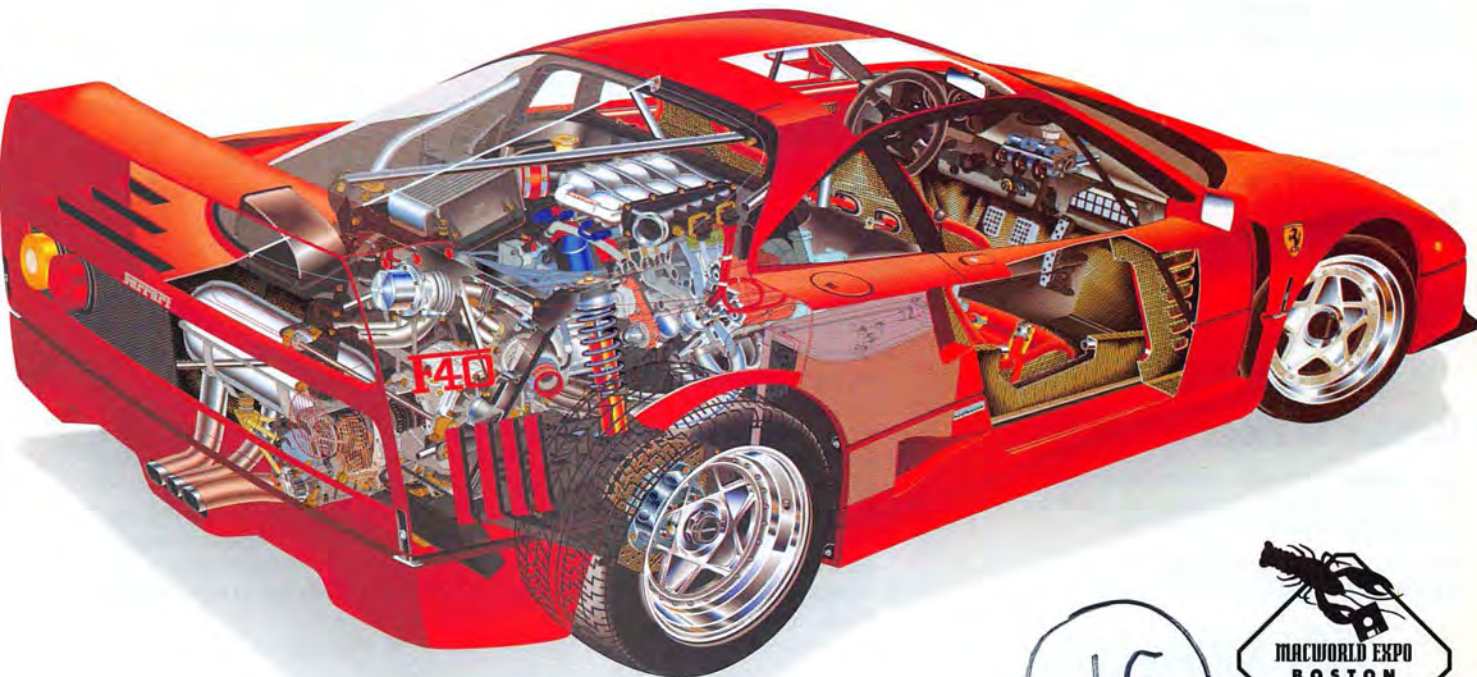
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LETTERS

capability, neither of which is available on Textronix's Phaser II PXe.

Dale Richmond
Director of Marketing
Seiko Instruments USA
San Jose, CA

As a supplier of PostScript-compatible imaging software to Seiko Instruments, GCC, and Pacific Data Products, we were dismayed to read Rik Myslewski's statement "the performance of PostScript clones rarely matches that of the real thing." This is not true. I'm sure *MacUser* has tested enough of today's PostScript-capable printers to realize that some PostScript "clones" have come a long way.

Tom Spillane
Marketing Manager
Phoenix Technologies
Cambridge, MA

Off the Charts

DeltaGraph Professional is good, but it's not a five-mouse program (see review, June '92, page 50). The program has at least one major bug: The Option-key characters don't print in PostScript. This is an obvious coding error and would be forgivable except that it was also present in DeltaGraph 1.5 and DeltaPoint promised that the problem would be fixed in DeltaGraph Professional.

William K. Dolen
Denver, CO

DeltaPoint acknowledges the problem and plans to fix it in version 2.02, a free update that was scheduled for release in August. — AA

Swing Shift

We are appalled at the review given ShiftWorker (June '92, page 57). Where did your reviewer get the idea that you can schedule employees only in one-hour increments? ShiftWorker can schedule work shifts in increments as small as one minute. In addition, you can schedule virtually any number of employees for any number of shifts. Further, version 1.04 has been shipping for more than a year, although your review listed 1.0 as the current version.

Kenneth J. Wiley
President
Expert Systems
Melbourne, FL

Our reviewer was indeed in error regarding ShiftWorker's shift-scheduling flexibility. Accordingly, we have raised the product's rating to 3.5 mice. — SJ

Database Debacle

As longtime developers of custom relational databases for the Mac, we take issue with several assertions in "Database Strategies: Relational Databases" (June '92, Buyer's Guide page 60). The four products reviewed are all excellent application generators, but the description and comparison of ACIUS' 4th Dimension was seriously flawed.

The 4D feature set is the clear leader in capabilities for casual as well as experienced users. Many features listed as new or "on the horizon" for FoxBASE+/Mac and Omnis Seven have long been standard in 4D. In addition, 4D's many add-on modules provide full-function spreadsheet, drawing, word-processing, and graphing capabilities that the competition only dreams about. Its ability to access data from mainframe and minicomputer systems turns multiplatform and large-application discussions into nonissues.

Your article said that "speed is only a single facet of database management," yet a significant portion of the article graphically illustrated performance issues that unfairly portray 4D as taking "close to 200 times as long as FoxBASE+/Mac." We have installed many large 4D systems, including one that has nearly half a million records but still operates satisfactorily on a Mac SE!

Jim Collar and John Andrews
Salt Lake City, UT

Keep in mind that before you can get anywhere with database software, you first have to program it! Therefore, programming time should be just as important a consideration as the speed of the finished application. Programmers charge \$40 to \$120 an hour, so the ability to code a database in an hour with 4th Dimension looks very attractive next to the day or more required to do the same thing with FoxBASE+/Mac.

You also failed to show how 4D would perform with its 4D Compiler software. I wonder how many people who have databases with more than 100,000 records — which is when 4D first shows a degradation in speed — would hesitate to pay the \$889 street price for the compiler, which ACIUS says speeds up 4D by as much as 3,000 times!

John W. Marshall
Naples, FL

Several independent consultants and developers have been unable to duplicate

3,000,007 reasons to upgrade to System 7.

1. Rave reviews.

MacUser gave System 7 its Editors' Choice Award. Byte, its Award of Excellence. Software Publishers Association named it a Best New Business Software Product of the Year.

2. One-step installation.

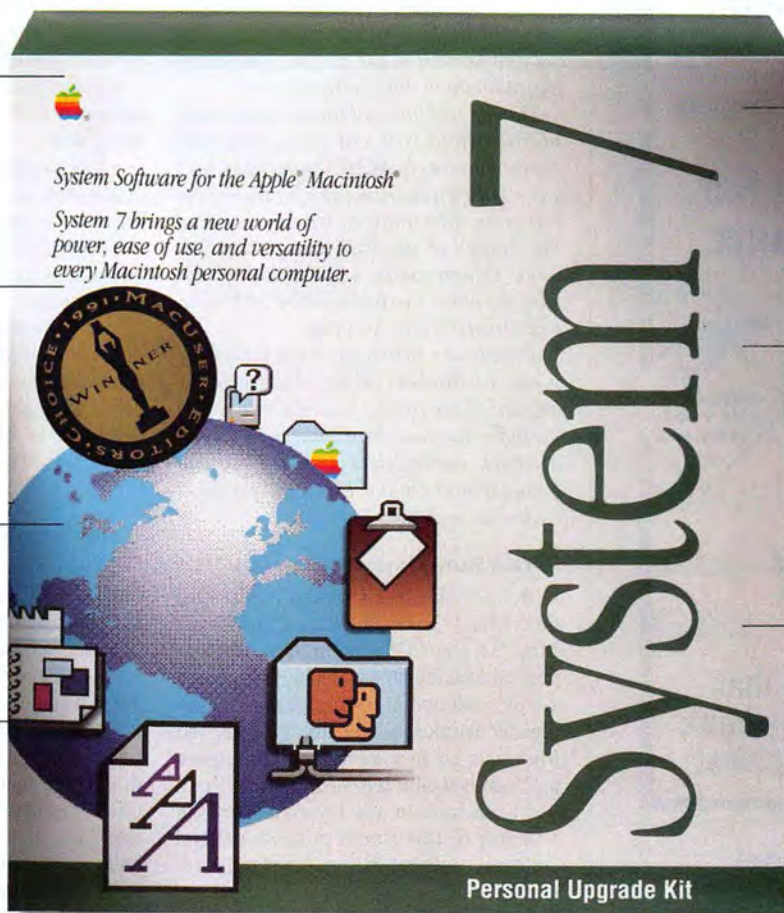
The "Before You Install" disk confirms the compatibility of your software (including INTS). Then, simply click the mouse to install System 7. Any questions? 90 days' toll-free phone assistance included.

3. It's developed quite a following.

Developers have shipped hundreds of applications that take advantage of System 7 power. Microsoft, Claris, Lotus, Aldus, Adobe and many more.

4. Runs on your Macintosh today.

System 7 works on all Macintosh computers. To run multiple programs, four megabytes of memory are recommended. Two megabytes are required.



5. Powerful software utilities.

System 7 will let you run the latest software utilities from Apple, including Macintosh PC Exchange, QuickTime™ and AppleTalk® Remote Access.

6. More power out of the box.

Macworld says, "The new Finder...is worth the cost alone." System 7 improves the way you organize, view and work with your information. Built-in file sharing lets you share files over a network, simply and easily.

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LETTERS

the performance degradation you reported for 4th Dimension with large numbers of records in a data file. *MacUser* owes its readers the courtesy of providing the information needed to duplicate the results or, better, a reevaluation and possibly a retraction of the report. The inaccurate results have not only resulted in confusion among developers and users but have also damaged the reputation of a powerful and flexible product.

Rich Gay
via ZiffNet/Mac

During our testing, *MacUser* Labs technicians inadvertently used an early prototype of our 4D test database (with compiled code) instead of the final database intended for the benchmark testing. This version-control error caused significant degradation in 4D's performance.

During our internal investigation, and in discussions with our consultants and representatives of ACIUS, other questions were raised regarding the equity of the test suite. Accordingly, we have revised the ratings of the four products as follows: Double Helix, 4 mice; 4th Dimension, 4.5 mice; FoxBASE+/Mac, 4.5 mice; and Omnis Seven, 4.5 mice.

Finally, the article does not reflect the views of Michael Miley, inadvertently bylined as the primary author. We regret the difficulties our errors may have caused Michael, our readers, consultants, and manufacturers and users of the products reviewed. — RM

The Run-Time Mac

John C. Dvorak's notion of the run-time Mac ("Take the Money and Run," May '92, page 328) contradicts the metaphor of Macintosh use. Using a Mac as a simple automobile-testing station or cash register belittles the machine's image. The Mac was created to be a multipurpose tool that is well integrated into the user's life, a machine on which you can perform a variety of tasks, both professional and amateur, without being constantly reminded that you're in front of a computer. Dvorak's run-time Mac would scrap this entire ideal. Macs would be like the throw-away technology found in cheap VCRs, televisions, and calculators.

I've seen Macs running cash-register programs sitting almost dormant in ticket booths at cinemas and in computer stores. One thought always pops into my mind: What a waste of a perfectly good Mac.

If IBM had better focus and imagination, instead of making meat scales and

clocks, it would have the computer with the perfect interface.

Robert Dewhirst
Lawrence, KS

It's time for a complete rethinking of the Mac models. Purchasing a computer shouldn't require extensive computer-assisted data analysis. I offer the following as a first draft of the Mac Simplification Act of '92:

- Macintosh Run-Time, a component for use in other products.

- Macintosh Classic, an all-in-one low-cost unit for family, student, and part-time business use.

- Macintosh Notebook, a model that's light in weight, cost, and features — truly for taking notes on the road.

- Macintosh Professional, a notebook computer that's also the heart of a desktop system.

- Macintosh Desktop, a box that can be configured at the point of sale for any business or educational use.

- Macintosh Poly-Tech, a unit for high-end graphical, scientific, and engineering applications.

With this simple product line in place, Apple will be free to concentrate on my proposed marketing plan: Build 'em good, price 'em right, and sell 'em like crazy.

Wayne W. Higdon
Albany, NY

Guy's Job Strategies

I loved Guy Kawasaki's article on job hunting ("Get a Job," June '92, page 29). It was heartening to read information with an adult perspective that was not condescending, and his comparison of a graduate to a can of Alpo was a gem.

Guy's point seems to be that no matter what you plan, plot, hope, and dream, you might find yourself doing something far different and definitely surprising 20 years later. I've had three or four distinct careers since college, and what I do now thrives because of completely different experiences a generation ago.

Barry E. Cohen
via ZiffNet/Mac

Guy's advice to potential Apple employees should certainly succeed in reducing the company's contemptible 10,000-résumé-per-month track record. With definitive career counseling such as "Take the shotgun approach" and "Don't take the shotgun approach," I realize/

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Now you can work with files stored on 3.5- or 5.25-inch DOS and Microsoft Windows-formatted floppies. Just pop the disk in your Apple® SuperDrive™ disk drive or compatible floppy disk drive. The Macintosh desktop displays the disk's icon automatically. (5.25-inch disks require a third-party drive.)

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Contents of DOS disks are displayed in a window on the Mac desktop just like any Macintosh disk. Files and subdirectories appear as standard Mac documents and folders. Open, save, rename, move, copy or delete them. You can even format DOS floppy disks.



Double-click and go.

The customizable control panel lets you create links between DOS files and Mac applications. Then, simply double-click on the file's icon to launch the application. (A DOS Lotus 1-2-3 file launches Lotus 1-2-3 for Macintosh, for example.)

Unlimited exchanges.

With Macintosh PC Exchange, any DOS file can be brought into any Macintosh application which reads that DOS file's format. In fact, files created by DOS/Windows applications like Microsoft Word, WordPerfect or Aldus PageMaker convert instantly to their Macintosh counterparts. Likewise, Mac files can be saved to DOS disks for use with compatible DOS/Windows applications.

Macintosh PC Exchange. Finally, moving files between a Mac® and a PC is as easy as moving them between two Macintosh® computers. So if you'd like the name of an Apple software reseller near you, call us at **1-800-538-9696, ext. 180.** They'll tell you more about Macintosh PC Exchange and show you how to bring the Macintosh and PC worlds closer together.

19

Macintosh PC Exchange requires a Macintosh computer with at least 3 megabytes of RAM, a hard disk drive, an Apple SuperDrive or compatible floppy disk drive and System 7 (version 7.0 or later). ©1992 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Mac and Macintosh are registered trademarks of Apple Computer, Inc. SuperDrive and System 7 are trademarks of Apple Computer, Inc. Aldus and PageMaker are registered trademarks of Aldus Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Microsoft Word is a registered trademark and Windows is a trademark of Microsoft Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. This ad was created using Macintosh computers.

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Steve Belmonte, President & Developer

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Bar Code/Country: [Barcode] USA
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Notes

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SOFTWARE PUBLISHERS, Inc.

CIRCLE 68 ON READER SERVICE CARD.

LETTERS

don't realize my past mistakes and will/ will not immediately erase Apple from my list of preferable employers.

Guy is also being too hard on himself when he says, "At this point we are all living off our reputations." Anyone brilliant enough to draw an analogy between a college graduate and a can of Alpo is just beginning to cultivate a reputation.

Peter Talbot
Calgary, AB
Canada

I inadvertently followed some of Guy's advice last year when I got a temporary receptionist job at Apple. I chatted with John Sculley each morning, but I'm sure he has no idea who I am, although I was tempted to include on my résumé "John Sculley loves the way I arrange mail."

During that time, I interviewed with well-connected people at big, slow-moving companies such as Hewlett-Packard, Informix, Ingres, and Borland. None of them offered me a job, but one woman gave my name to her favorite headhunter, who ended up finding me my current position at a high-tech public-relations firm with really cool clients doing news-worthy things.

Pamela Laurence
Palo Alto, CA

Guy Kawasaki recommends that young people go to work for Procter & Gamble because of their training programs. But if they don't take time to learn how to spell the company's name properly, they will likely not get past the first interview. It's *Procter* with an *e*. Also the company name has an ampersand, not the word *and*. This may not be a big deal to most folks, but we P&Gers are kind of sensitive about it.

Gerry Saddlemire
Cincinnati, OH

Clarifications

Contrary to the information on Buyer's Guide page 14 of the July '92 issue, in "Pocket Opticals: 3.5-Inch Magneto-Optical Drives," MacProducts' Magic 128REM drive ships with FWB's Hard Disk Toolkit.

The correct toll-free number for DeltaPoint, maker of DeltaGraph Professional 2.0 ("Chart Stars," July '92, page 92), is 800-367-4334.

The telephone number for information about Hayes Connect 3.0 (Power Tools, May '92, page 213) is 404-840-9200.

We'll show you how to play the media better than Bush, Clinton and Perot put together.

Easy to get rolling.

You don't need extra hardware to start working with QuickTime. Simply drag the QuickTime system extension into your System Folder. Now applications designed to support QuickTime can work with digital video sequences, animation movies, sound files and compressed images.

View and edit QuickTime movies.

Play, pause, fast-forward, rewind and advance frame by frame with the MoviePlayer application. Copy video and animation clips, paste them together, create your own movies.

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Shrink them to a fraction of their original file size and save valuable space and transmission time with the Picture Compressor application. (Compressed files can be used automatically in any existing application that supports PICT files.)



Convert existing data into movies.

Convert other file formats (AIFF, PICS, PICT, Scrapbook, DOS image formats) to QuickTime movies with the Movie Converter application. Control frames per second, compression scheme and color depth.

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Digitize video and sound easily with the Movie Recorder application. View what you've recorded, save it or toss it out and try again. (Requires a video-capture card and sound digitizer.)

The Starter Kit.

Includes the system extension and Scrapbook, MoviePlayer, Movie Recorder, Movie Converter and Picture Compressor applications. Plus QuickClips, a CD-ROM disk with samples of movies and still color images and an electronic catalog of products that support QuickTime.

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QuickTime requires a Macintosh computer with a 68020, 68030 or 68040 processor. At least 4 megabytes of RAM. An Apple SuperDrive™ or compatible floppy disk drive. A hard disk drive. System 6 (version 6.05 or later) or System 7 (version 7.0 or later). You'll also need an Apple CD-ROM drive or compatible CD-ROM drive for accessing the contents of the CD-ROM. ©1992 Apple Computer, Inc. All rights reserved. Apple, the Apple logo and Macintosh are registered trademarks of Apple Computer, Inc. QuickTime, QuickTime, SuperDrive and System 7 are trademarks of Apple Computer, Inc. This ad was created using Macintosh computers.

For people who
don't.



Everyone who uses a Macintosh® ought to back up regularly. But most people don't back up at all.

In fact, if the people in your company are like those at most other companies, about the only way you're going to get regular backups out of them is to do it without them.

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Now you can set up fully automatic, unattended backups for every Mac in the house.

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The Macintosh version of the world's most popular backup software is also the Mac world's most flexible backup software.



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It also lets you back up in the background while you're using an application or two in the foreground.

It even formats floppies on the fly, so you don't have to bother.

And it comes complete with our unique Macro Editor.

What, you ask, makes our Macro Editor unique?

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That's right. You can actually restore a Mac file directly onto a PC, and vice versa.

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In addition to floppies, hard disks and other HFS devices, Fastback Plus for the Macintosh lets you back up to direct access and streaming tape drives.



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 **ASANTÉ**
ALL THE RIGHT CONNECTIONS™

The Fifth Mouse



Vanished! The missing mouse was nowhere to be seen. Where did it go — and what would it take to bring it back?

The rain made a noise on the cheap tin roof like — well, like rain on a cheap tin roof. It was late. I was ready to call it a night when the phone pierced the darkness with its familiar darkness-piercing ring.

"One of our mice is missing," cried the agitated voice at the other end.

"I'll get right on it."

I recognized the voice right away; it was Phil "Eep" Icon, the brilliant, peripatetic president and founder of MouseTrap Software.

As I drove down to MouseTrap Plaza, the rain drove down on the windshield like — well, like rain on a windshield. I went over the facts as I saw them and started formulating a game plan.

Fact: MouseTrap had built its global software empire from its humble origins in a Silicon Valley garage, based on a philosophy of innovation, consumer-oriented pricing, and quality technical support. "We didn't just build a better MouseTrap," Icon was fond of saying. "We price it right, and we keep our customers happy."

Fact: Icon was proud of his track record with reviews in *MacUser*, the premier product-picking publication of the Macintosh industry. Every one of his products had received a four-and-a-half-mouse rating or higher. But now, judging by his urgent plea on the phone, things were different.

I walked into the deserted lobby at One MouseTrap Way, where the security guard escorted me to Icon's plush, palatial penthouse office on the 65th floor.

"Thanks for coming," said Icon. "Our fifth mouse . . . It's missing."

"Missing mouse? When was it last seen?"

"That's just it — it wasn't. Look."

Icon opened the latest issue of *MacUser*. Sandwiched between the ads for MacCorrection (mail-order software for prison inmates) and MacDespot (mail-order software for tyrannical dictators) was the evidence: "*MouseWorks, from MouseTrap, gets three and a half mice.*"

As I read from the review, Icon paced the floor anxiously, like a — well, like an anxious floor-pacing software-company executive whose product had just received three and a half mice.

"*MouseWorks does it all, according to its ads. And although this latest entry in the integrated-spreadsheet/word-processor/slicer/dicer category may indeed do it all, it*

lacks some of the ease of use that . . ."

"Looks like a fair review," I said, after finishing "The Bottom Line." "But how'd they find out about the Maltese Easter egg?"

"Forget the egg!" shouted Icon. "Where's the missing mouse? We've always gotten at least four and a half mice. So what's wrong with MouseWorks? Or," he said, as his eyes narrowed to two suspicious slits that had the look of — well, of two suspicious narrow slits. "Or . . . is there something wrong with *MacUser*?"

"Look, Icon, times are changing. Software's getting better. It takes more to keep up with the competition these days. And, besides, three and a half mice isn't a bad rating at all."

Deflator Mouse

"Look at it this way, Icon. Remember your first product, MouseWrite, way back in 1984. You got five mice for that one, remember? Worked with your choice of two fonts, as long as they were Helvetica and Courier, remember?"

"Yeah, I remember. So?"

"Well, so nowadays MouseWrite wouldn't even rate a zero on the *MacUser* mouse scale. Times change. You just gotta keep up — or your mice are gonna drop like flies."

Icon was still alarmed. "But . . . three and a half mice?"

"Relax — even three mice ain't so bad."

"Oh yeah?"

"Yeah. Here's how mice are handed out. Five mice — well, that's a product you just gotta have. Can't go wrong with this one."

"Four mice — not a bad little product at all. Maybe the *MacUser* editors were disappointed by a feature or two, maybe the competition's ahead here and there. But if you get a good deal on this guy, or if the one badly implemented feature is something you don't use anyway, go for it."

"Three mice: Well, three mice is the cut-off. Anything three mice or above is generally worth your money. Maybe there's something better out there — more features, better support, lower price. But if you particularly like something about a particular three-mouser, don't hold yourself back."

Icon was relieved. But then a new wave of concern drifted across his face: "What about . . . what about two mice?"

"You don't want a two-mouser, Icon. And neither do your customers. Two mice means

trouble: Something's cheesy in the state of Denmark. A two-mouser product doesn't work the way it's supposed to. Or it has nasty bugs that can destroy your data or even interfere with other products."

"And . . . one mouse?"

"Stay away. Don't touch. Keep out. A one-mouser means there's some kind of fatal bug. If you're lucky, it'll just be fatal to your data or your Mac."

"I get the picture. But three mice . . ."

"Three mice is fine. And you'll be seeing lots more products getting three mice. It's just a shift in the scale. And an overdue one at that."

"How do you figure?"

"Look, given a choice, *MacUser* would rather cover a good product than a lousy one. They'd rather cover an innovative, cutting-edge product than a me-too one."

"Yeah . . . so?"

"So this: What do you get when you cover more good products than bad ones, more innovators than copycats? You get a lot of highly rated products. You get a lot of mice. So you need to recalibrate from time to time to make sure there's enough room at the top of the scale. But as long as you still measure all the competing products on the same yardstick, it's still a fair game."

Dances with Mice

"OK, OK. So three and a half mice isn't so bad. But, listen . . ." Icon's voice suddenly became hushed: "We gotta get that mouse back. What's it gonna take? What's left to invent?"

"Gee, Icon. I dunno. That kind of research is kinda expensive."

"Name your price," said Icon as he pulled out his checkbook.


"Cash only," I said.

"Cache only? That's the secret to the fifth mouse? I should have figured it was something like that." Icon was already mentally redesigning the architecture of his software to accommodate a new RAM-caching scheme.

"Now listen to me, Icon. Forget the cache — and the cash. There's no mystery to getting five mice. Your customers just want products that get the job done. You don't have to reinvent the wheel to get that fifth mouse; you just have to make it spin more smoothly."

"Take word processors. Even a simple feature — like counting words — never seems to work quite right. It can vary by as much as 10 percent, depending on which word processor you're using."

"Or printers — you know the 'rated engine speed' most manufacturers cite in their product literature? That's got about as much to do with how fast the printer'll go as the top speed painted on your car's speedometer."

Icon's mind was already spinning, and so was my head. My job here was done, while Icon's was just beginning. Outside, the rain had cleared up — and so had the case of the missing mice. 

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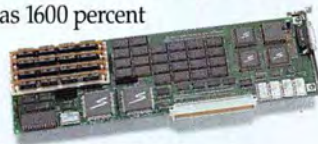
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SUPERMAC
The SuperSource for Color

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Come see us at MacWorld Expo Boston -
booth #5304, World Trade Center

CIRCLE 170 ON READER SERVICE CARD.

Coming soon to a screen near you.



Out of memory.

OK

If you think the only way to avoid running out of memory is to avoid running a couple of your favorite applications, think again.

Think about all those memory-hogging fonts and sounds you've got stuffed into that bulging System File.

Then do what over 200,000 resourceful Mac users do every day.

Instead of closing your applications, open a Suitcase."

Suitcase is the award-winning utility that lets you park your growing collection of fonts, DAs, FKEYs and sounds *outside* the System File.

Thereby giving you the maximum amount of memory for running more applications, building bigger documents and doing other useful things.

What's more, Suitcase compresses your screen font and sound files by up to 60%.

Thereby giving you that much more precious disk space to work with.

It even lets you put your screen and printer fonts on a server for all to share.

Thereby making each disk on the network that much more spacious.

The more resources you have—and the more organized you are—the more memory and disk space you'll save.

But whether your dividends are measured in megs or merely in Ks, Suitcase is guaranteed to save you gigabytes of aggravation.



Even if you're operating in System 7.

Because System 7 still stuffs your resources into your System File.

And System 7 still makes you close down all your applications and restart your Mac each time you install a new font.

Which is a real pain in the, uh, system.

Suitcase, on the other hand, gives you unlimited access to all your resources.

And total control over how you organize them.

Each suitcase can pack up to 800 fonts, 64 DAs, and any number of FKEYs and sounds.

You can group suitcases into sets, then summon all the luggage that

Can't remember the difference between Versailles and Monaco?

Not to worry. Suitcase displays your typefaces right in the menu.

belongs with a particular project at the click of a mouse.

Tips are optional. But here's one for those of you who find font ID conflicts even more irritating than running out of memory.

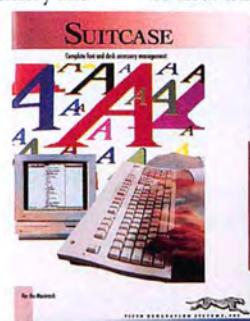
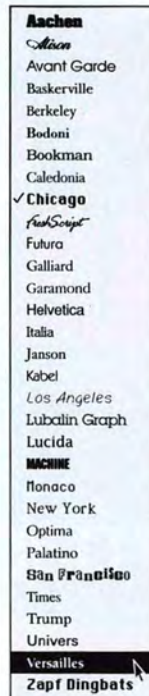
Get Suitcase. It eliminates them.

Call us at 1-800-666-2904.

We'll tell you about our vaunted 24-hour toll-free technical support.

We'll also tell you that Suitcase is backed by a one-year money-back guarantee.

So you can be sure this baggage will live up to its claims.



FIFTH GENERATION SYSTEMS, INC

CIRCLE 107 ON READER SERVICE CARD.

Check It Out



Don't get burned. Consumer gadfly Andy Ihnatko knows how to tip the scales in your favor before you spend your money. This month: How using your Mac can stain your credit rating.

When you think about it, buying software and hardware is like voting for president. Of the dozens of sub-standard schmoes originally available, you vote for the one you hate the least, and if you make the wrong decision, you're stuck with it for the next four years. Granted, a word processor doesn't have the power to launch nuclear missiles at Canada, but you get the idea.

It shouldn't be like this. I mean, you don't have these problems when you buy pants. You go to the pants store, find someone with a name tag, and say, "Sell me some pants." They show you the pants they have in stock — a small assortment that nonetheless covers the full spectrum of pants needs for just about everyone. You get to try the pants on, and if they're not exactly what you need, the pants person will work to find you a pair that fits. If you end up buying a pair, you can come back a week later, offer some lame excuse, and get your money back. No wonder the number of satisfied pants owners in America exceeds that of computer owners.

All I want to say is that being a Mac consumer in this day and age isn't the piece of cake it might have been 10 years ago. In the interests of making your road a little wider, a little smoother, a little flatter, and with more public lavatories right where you need them, we present to you . . . me! My charter is to fight for the rights of all Mac consumers, to root out slimeballs wherever they may be, and to change the names to protect the innocent (neatly dodging another pesky lawsuit). Here's how I propose to do it:

No Gratuitous Violins

Sticking It to the Twits. There's a reason why "60 Minutes" is such a popular show. Viewers don't tune in to hear about the latest 12-year-old concert violinist or about the lady in Philadelphia who built a two-story youth center entirely out of discarded egg cartons without government funding. People tune in because they love a good scandal; there's no better way to spend a Sunday night than hearing about a baby-food company that tried to sell used brake fluid as 100-percent grape juice. So when a company tries to pull similar shenanigans with the members of the Mac community, I'll look into it and set you hip, pronto.

Essential Consumer Information. You've

got laws that protect you as a consumer. They won't do you much good if you don't know about them, though (oddly enough, manufacturers don't usually volunteer this kind of information). In addition, there are simple tips and techniques for locating sources of software and hardware and for not getting taken to the cleaners when you decide to make a buy. There are even ways — hushed, arcane methods, some involving a forest glen, a full moon, and nudity — of getting useful information and answers from Apple Computer. I'm planning to present you with wheelbarrows of information as useful as this, if not usefuller.

Occasional Oscar™ picks. As the only computer-industry columnist providing regular coverage of the Oscar race, I hope to be deluged with free movie tickets, promotional gewgaws, and studio-sponsored press junkets to exotic locales. So sue me.

A Little Humor. Hey, fighting injustice ain't all doom 'n' gloom. Keeping a little perspective on your petty little crises of consuming may help prevent the next one. If you want all your activism to be earnest and dour, stick with Ralph Nader. Plus it really helps pad my word count. (See, there's a joke right there.)

That, in a nutshell, is what I've got planned. If you have any pressing consumer-related questions, have had a particularly rapturous or hellacious experience dealing with a certain company or product, or just want to get something off your chest besides the shirt off your back, then by all means drop me a line and fill me in. Devotees of the USPS can address their correspondence to *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Those of you who are hip with electronic mail can message me via CompuServe (72511,204), America Online (andyi), or the Internet (andyi@world.std.com).

First Blood

Just to give you a taste of the sorts of issues I'll be discussing, let's kick things off with a look at CheckFree. It's an electronic service that lets you pay your bills, not with the pre-Revolutionary method of writing and mailing out paper checks but by the Jetsons-age method of electronically transferring funds from your bank account directly into the payee's. Using either the checking software provided by CheckFree or a third-party financial package that supports the CheckFree

Top-Notch Security...



FolderBolt

Another great idea from the original Mac security experts

There's nothing like FolderBolt!

Kent•Marsh Ltd. brings you folder protection from the desktop with just a Shift-Click! Create password-protected, read-only, or drop folders. Lock the running System Folder or your hard disk's window. The latest version even prevents file sharing.

Reviewers agree. FolderBolt is top-notch security from Kent•Marsh Ltd., the experts in the Mac security field since there was a Mac security field.



"If you're looking for a straightforward, easy-to-use solution to the problem of computer security, look no further than FolderBolt."

MacUser



"Easy to use, extremely flexible... should easily meet your security needs." MacWorld

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CIRCLE 36 ON READER SERVICE CARD.

30 September 1992 MacUser

ANDY IHNATKO

service (such as Intuit's Quicken), you specify who's to be paid, how much, and when. The software then transmits this information via modem to the CheckFree Corp., which then handles the electronic transfer of funds through the Federal Reserve. If the payee can't accept electronic payments, CheckFree will laser-print and mail standard paper checks. Both the electronic and the paper payments appear on your monthly bank statement; your local bank treats the electronic checks made via CheckFree just like traditional paper ones.

CheckFree is a phenomenally slick service, and it offers a glimpse at what *all* banking services will be like in the not-too-distant future. Here in 1992, though, the system still seems to have a few holes. According to the reports from disgruntled CheckFree users, it's hardly a fail-safe system. In the time since CheckFree became available for the Mac, reports of electronic payments that either never reached the payee or were posted late have appeared fairly regularly on on-line services. The problems seem to crop up because there are several links in the electronic-payment process. First, of course, there are the users. The CheckFree software is well thought out and reports all problems to users, but nonetheless it's very easy for someone who hasn't read the manual to go to bed, secure in the tragically false knowledge that payments have been made, without actually having completed the few necessary steps for transmitting payment info to CheckFree. Also, to quote the CheckFree manual, "CheckFree is not a tool to get your bills paid at the last minute." CheckFree recommends that you submit a payment request at least five working days before it has to be received by the payee.

OK, as long as you give CheckFree plenty of notice and use the software properly, everything's golden, right? Wrong. The second half of the snafu equation is picked up by the payee. Unfortunately, not all the people you send checks to can handle electronic money transfers gracefully. Because all-electronic payments don't come accompanied by a payment stub, a suitably incompetent lending institution can post your payment incorrectly. Worse, many companies delay posting electronic payments for as many as ten business days. You did everything right, CheckFree did everything right, but nonetheless your

mortgage payment shows up almost three weeks late — a scary scenario.

For its part, CheckFree is very upfront about the inherent limitations of its service. The company recommends that before you use CheckFree, you contact all your regular payees directly and inform them that you want to make your payments electronically. CheckFree also recommends that you make your first set of payments weeks in advance and follow up on each one carefully. Finally, if CheckFree somehow messes up and fails to make a payment for you by the date you specify, it'll pay whatever late fee the payee sticks you with — as much as 50 bucks. But if the payee doesn't post your payment in time because of its own lack of electronic know-how or if CheckFree has to print a check and send it out via snail mail and it arrives late, you're on your own. Also, practically nothing can reimburse you for any damage to your credit rating or the possibly serious repercussions of a late payment.

There are good points, however. Whether I called as an ordinary consumer or as an investigative hound frenzied by the scent of fresh red ink, the folks at CheckFree were helpful and forthcoming with information. It would also be grossly unfair not to mention that there are thousands of people who use CheckFree every month without a single problem.

My Two Cents' Worth

CheckFree is a service whose time *will* undoubtedly come one day — here and now, though, it's just plain impractical. Sure, there can be delays when you mail checks the old-fashioned way, but at least you're using a system you already know and the payee will be sure to get a form of payment that it's comfortable with. On top of all that, CheckFree is pretty expensive: \$9 a month for as many as 20 transactions and \$3 for every 10 transactions thereafter. That's enough to get The Disney Channel and Cinemax for a month, folks.

Almost any home-finance program can automatically print checks on customized dot-matrix or laser-ready banking stock. If you're writing so many checks that the task of putting those preprinted checks in the mail and licking the envelope flaps every month is a crippling, demoralizing physical burden, you can clearly afford to hire an accountant to handle all that stuff for you. ☹

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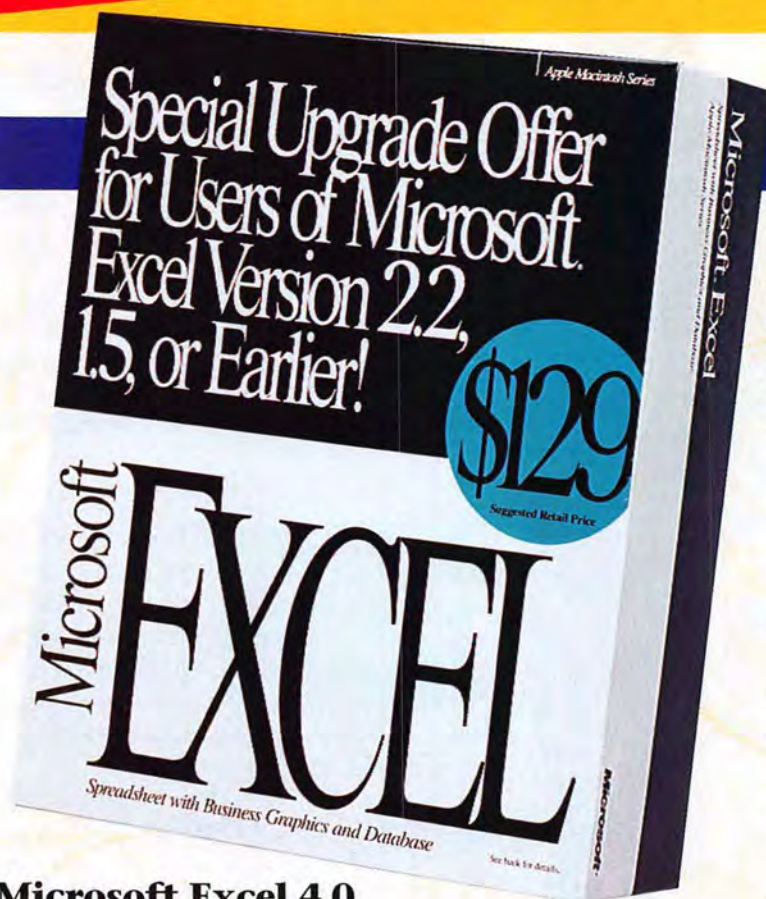
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04881	105	3.5"LPS	Quantum	17	2.0-4.0	499	5
04882	240	3.5	Quantum	16	5.0-10.0	\$848	4
05367	330	3.5	Fujitsu	12	4.0-5.0	1358	3.2
05366	520	3.5	Fujitsu	12	4.0-5.0	1584	4.3
04451	45	5.25"	Syquest	19	1.2	548	12
04886	88	5.25"	Syquest	19	1.2	698	8



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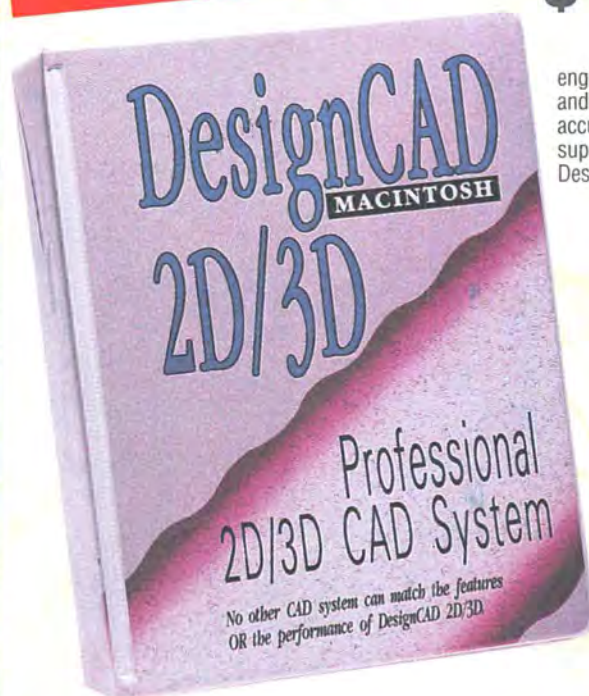
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CLASSIC with adapter	Classic	2*	80	4	03428	1	\$ 34
MAC II, IIx, IIfx, IIfx	Mac II, IIfx, IIfx, IIfx	8	80	8	03428	1	\$ 34
	Mac II, IIfx, IIfx, IIfx	8	80	32	03584	4	137
	Mac II, IIfx, IIfx, IIfx	8	80	64	00848	8	499
	Mac II, IIfx, IIfx, IIfx	8	80	128	00849	16	799
MAC II FX	Mac IIFX	8	70	8	03579	1	\$ 42
	Mac IIFX	8	70	32	03585	4	189
	Mac IIFX	8	70	128	00849	16	698
	Mac IIFX	8	70	256	05338	16	698
QUADRA 700,900	Quadra 700	4	70	8	03579	1	\$ 42
	Quadra 700	4	70	20	03583	4	124
	Quadra 900	16	70	16	03428	1	34
	Quadra 900	16	70	64	03583	4	124
POWER BOOK	Quadra 900	16	70	128	00848	8	498
	Quadra 900	16	70	256	05338	16	698
	PB 100/140/170	1	80	4	05391	2	\$ 148
	PB 140/170	1	80	6	05392	4	268
LASERWRITER	PB 140/170	1	80	8	05393	6	398
	LaserWriter NTX	12	70	12	03586	1	\$ 49
SE/30, IIsi	SE/30	8	80	8	03428	1	\$ 34
	SE/30	8	80	32	03583	4	124
	Mac IIsi	4	80	5	03428	1	34
	Mac IIsi	4	80	9	03936	2	274
LC/LC II Classic II	Mac IIsi	4	80	17	03583	4	\$ 124
	Mac LC/LC II/Classic II	2	80	4	03428	1	34
	Mac LC/LC II/Classic II	2	80	6	00014	2	68
	Mac LC/LC II/Classic II	2	80	10	03976	4	158 ⁵⁰

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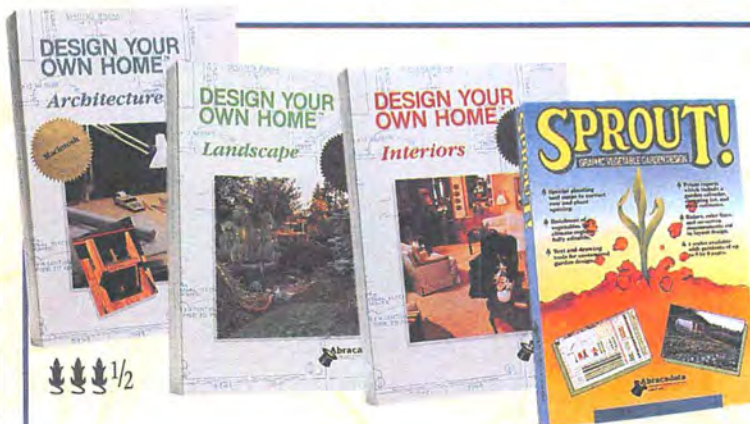
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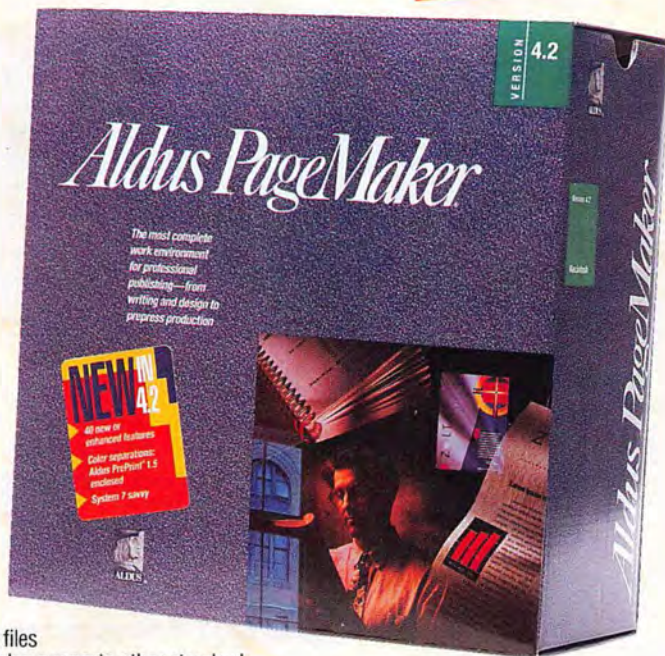
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SuperOffice #04966

From	To	Customer	Type	Text	Comp.
8:00A	8:45	Brownstone	Meeting	Discuss proposal	
9:00A					
10:00A					
11:00A					
12:00P	1:00	BYTE	Other	Lunch with Morgan	
1:00P	2:00	BYTE	Demo		
2:00P					
3:00P					
4:00P					
5:00P					
6:00P	6:00		Other	Tennis at 17th Tennis	
6:00P	10:00		Meeting	Board meeting-Tennis club	
9:00P					

Notes: Do not forget the airplane tickets!

Customer	Type	Text	Complete by
BYTE	Call	Call Susan to verify quotation	1/31/92
Brownstone Corpora	Orig. letter	Send revised proposal to John	2/5/92
Johnston, Inc.	Demo	Schedule product demo	2/15/92

ABC Company, Inc. Greg Jenkins

CUSTOMER		ABC Company, Inc. Greg Jenkins	
Brownstone Corporation		Code:	BROWNSTONE
Address 1:	One Hill Street	Number:	89005
Address 2:	P.O. Box 67	Business:	Bookings
City:	Sageville	Category:	Customer
State/Zip:	WA 01678	Total sales:	\$5,900.00
Country:		Employees:	23
Telephone:	(415) 670-7690	Unit change:	G- 1/28/92
Telephone 2:	(415) 670-5769	Stop:	Interests
Our contact:	GJ Greg Jenkins		

Mr/s	Last name	First name	Title	Comments
Mr.	Johnson	Mark	President	Previously with Brownstone, Inc.
Mr.	Wall	James	Vice President	
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Rev 6/92

It's easy to use. SuperOffice uses only a few screens, and it prompts you for all entries. You can choose to run the program with the intuitive ease of pull-down menus or the speed and simplicity of command "speed" keys. SuperOffice windows resemble familiar desk items, e.g., Post-It notes, calendar pages, index cards and paper clips.

It's multi-user compatible. With the multi-user version you can share access to the same information. On a common network, Macintosh and MS-DOS computers can access the same file.

It's powerful. Powerful and comprehensive, SuperOffice business information and contact management software instantly provides you with the information you need to succeed.

It's flexible. You get user-definable system setup, user-definable spreadsheet and word processing templates, user definable contact classification fields and more. Going on a business trip? Export the data you need from SuperOffice and update the master data file with the new information when you get back.

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Casady and Greene	
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03624 Alarming Events	83 ☐ ✓
01497 Calendar Maker 3.0	30 ☐ ✓
Disctech Corporation	
04550 Facilitator	219 ☐ ✓
Nolo Press	
00481 Will Maker 4.0 Mac	34 ☐ ✓
03781 For The Record 2.0 Mac	28 ☐ ✓
04720 Living Trust	69 ☐ ✓
Now Software	
00580 Now Up To Date	64 ☐ ✓
Pastel Development	
04752 Daymaker	64 ☐
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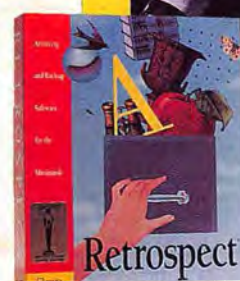
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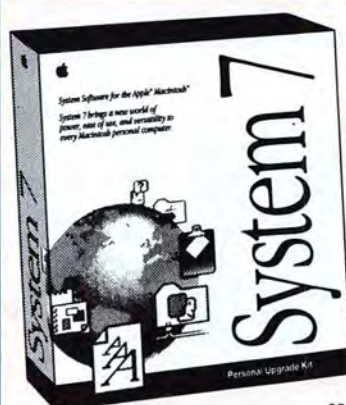
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00510 Maccon 3 SE	218	✓
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00820 Maccon + 30 IE MC 64	314	✓
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04184 Maccon + 30 IET MC64	314	✓
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04933 Maccon 3 IIs	218	✓

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00003 Dayna Etherprint 10T	342	✓
00321 EtherPrint Plus 4 Devices	598	✓
00322 EtherPrint-T Plus 4 Devices	598	✓
00485 DaynaPort SCSI Link	272	✓
00487 DaynaPort SCSI Link-T	272	✓
00488 DaynaPort SCSI Link-3	299	✓
00804 DaynaPort E/Z	264	✓
00805 DaynaPort E/Si	148	✓
00806 DaynaPort E/LC	148	✓
03546 Dayna Etherprint	348	✓
04139 DaynaPort E/Z T	264	✓
04297 Dayna DI2000 Single User	204	✓
04595 DaynaPort E/II-T	148	✓
04717 DaynaPort E/30	148	✓
04718 DaynaPort E/II	148	✓
04911 DaynaStar Minihub	238	✓
05184 NetMouter Single User	54	✓
05185 NetMouter 5 User	224	✓
05186 NetMouter 10 user	334	✓
05188 DaynaPort SCSI/Link PB	294	✓
05189 DaynaPort SCSI/Link T PB	294	✓
05190 DaynaPort SCSI/Link 3 PB	338	✓
05191 DaynaSTAR Hub-12	682	✓
05279 DaynaPORT TRX-T	86	✓
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00677 EtherMac II-10T	158	✓
00678 EtherMac II-C	208	✓
00679 EtherMac LC-TN	158	✓
00680 EtherMac LC-TN + FPU	248	✓
00681 EtherMac LC-10T	158	✓
00682 EtherMac LC-10T+FPU	248	✓
00683 EtherMac LC-C	208	✓
00684 EtherMac LC-C+FPU	298	✓
00685 EtherMac 30i-TN	188	✓
00686 EtherMac 30i-TN+FPU	278	✓
00691 EtherMac 30i-10T	188	✓
00692 EtherMac 30i-10T+FPU	278	✓
00693 EtherMac 30i-C	238	✓
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00626 Si 10BT/Thin EN	228	✓
00627 SE/30 10BT/Thin EN	224	✓
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Next Year's Model



The PowerBook in your lap and the Newton in your palm were cooked up in the research labs of the '70s and '80s, but is anybody out there working on tomorrow's hot products?

During the past five years, American industry has been shifting away from basic long-term research and toward market-oriented short-term research. Companies like Apple look at companies like Xerox — whose Palo Alto Research Center (PARC) spawned the graphical user interface, the desktop metaphor, the iconic representation of documents, windows, the laser printer, page-description languages, object-oriented programming systems, notebook computers — and all they see is failure.

Why? Simply because Xerox failed to turn its ground-breaking research into products that profited Xerox. Other companies (Apple and Adobe, for example) have profited greatly, as have computer users, but Xerox benefited little.

Companies are trying to avoid the Xerox mistake in two ways: by scaling back total investment in research and development and by refocusing that investment toward research that looks likely to turn into products within a predictable period. According to National Science Foundation data as reported by Elizabeth Corcoran in the June '92 issue of *Scientific American*, annual real growth in industrial R&D spending dropped to 1.5 percent between 1985 and 1990, down from almost 7 percent between 1975 and 1985.

But the real story is how companies are refocusing their research. Here's how it used to be: When I was a graduate student in computer science in the late '70s, a fellow student interviewed for a job at AT&T's prestigious Bell Labs facility. The interviewer told him that as a Bell Labs researcher, he would be free to pursue any interesting project, "as long as it didn't have anything to do with telephones." Anyway, that's what he told me. It was the attitude then prevalent at places like Bell Labs and Xerox PARC.

These days, according to Corcoran, things are much different. Xerox, for example, now calls itself a "document company" and demands that research projects support this characterization. A project to develop a scalable-multiprocessor computer didn't fit this model, so Xerox found a corporate partner to develop it. Apple is not exempt from the trend: Its ATG (Advanced Technology Group) has been refocused as well.

Is this anything to be concerned about? Does it matter to the average Mac user that Apple and the rest of the industry are shifting to nearer-term research projects?

This being an election year, I thought I'd present arguments in the form of a debate between two users, whom I will call, in a blatant rip-off of the comic strip of the same name, Frank and Ernest.

Debatable Developments

Frank: If you ask me, we've had quite enough innovation for the time being. I'm tired of buying hardware that's obsolete before I get it plugged in, and I can live without the software innovations that dictate that 2 megabytes of memory is an entry-level configuration. What we need now is not innovation; it's consolidation. Let's make our existing tools work better for us. Rather than basic research, we need the most practical sort of research: Computer companies need to examine how people work with computers and see how they can better integrate the boxes into people's lives. They need to tame existing innovations to serve us better.

Ernest: That's fine for now, but will you be content with the same hardware and software ten years from now? If System 7 is any indication, further refinements of today's standard user interface, however elegant, will not lead to any simplification or overall increase in ease of use. Most of that interface, most of the defining features of today's personal computer, in fact, were developed at Xerox PARC in the 1970s, and it took more than a decade to bring the fruits of that work to the majority of users. The PARC researchers, by the way, attempted to do just what you suggest: examine how people work with computers and try to better integrate them into people's lives. Basic research is long-term research. The research behind the computer of the year 2000 had better be under way now.

Frank: And it is. What do you think Taligent (Apple and IBM's joint operating-system venture) is about?

Ernest: It's certainly not the equivalent of the ground-breaking PARC research. A better example might be Kaleida (another Apple/IBM joint venture to develop multimedia technology), and look how much trouble it's having getting off the ground. If there is a recent equivalent to the PARC work, it might be Brenda Laurel's work in the 1980s at Apple. Laurel, who edited *The Art of Human-Computer Interface Design* (Reading, Massachusetts: Addison-Wesley Publishing Co., 1990), believes that the entire concept

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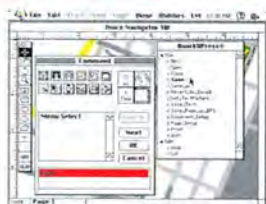
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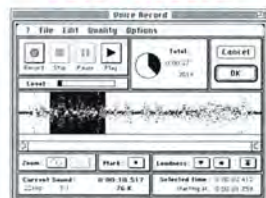
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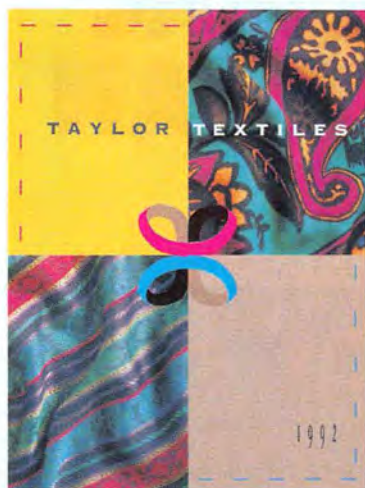
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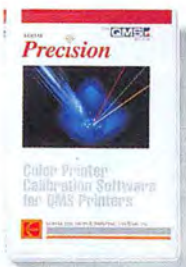


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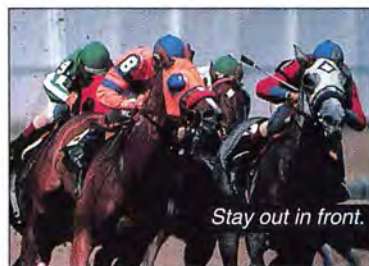
For The Mac LC, LC II, II, IIfx, Ilicx, IIsi, Ilic, SE, SE/30 and Classic...

Universal PowerCache™ — When you're ready for the ultimate in acceleration, turn to our award-winning PowerCache. We use the power and reliability of a 68030 processor (at 33, 40, or 50 MHz speeds) to offer performance gains up to Quadra-level speed. Our single, universal PDS design supports ten Macs*, and is 100% compatible.

For NuBus Macs... Break The Hard Drive Bottleneck.

DayStar offers you two ways to speed up applications that need fast hard drives.

RAM PowerCard™ — Put SIMMs on a



NuBus card. Get a superfast internal RAM drive for one-fourth the price of an external RAM drive. Accelerates large files up to 300%.

SCSI PowerCard™ — Puts new life into slow drives and removables. Disk intensive applications run up to 200% faster.

The Upgrades You Need.

Our Swap-Up program lets you upgrade your system as your needs change. Call us at the number listed below for details.

Get all the details.

Call for an immediate fax!

800-962-2077



*For the PowerCache, a simple adapter is required for all non-Ilic installations. Ilicx model requires a socket installation that is free from DayStar.



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DIGITAL

SEE US AT MACWORLD, BOSTON
Booth #5128

5556 Atlanta Highway, Flowery Branch, GA 30542 - In NJ: (404) 967-2077, Fax: (404) 967-3018 - This ad was completed on a Mac with DayStar upgrades installed.
CIRCLE 159 ON READER SERVICE CARD. Also available on GSA Schedule #GS00K91AGS047

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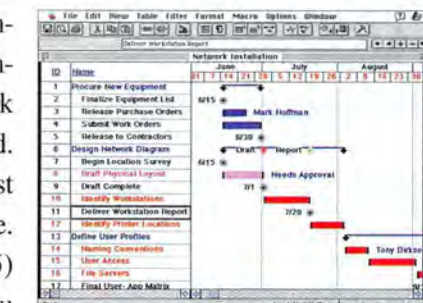
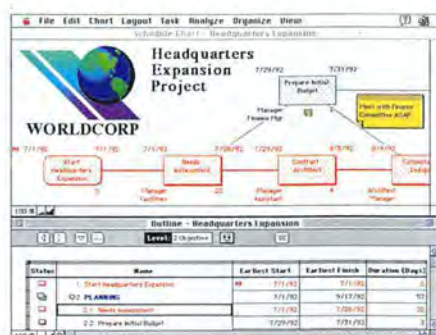
NEW ON THE MENU

Visual alchemy: Morphing is the current rage, and Gryphon Software (619-454-6836) has produced a simple morphing utility, Morph (\$149). To create a QuickTime movie, you pick two PICT images of the same size, match a point in the starting image to a point in the final image, and set the length for the metamorphosis. Hours and hours of nonproductive fun are promised.

By Russell Ito

Project managing: Aerospace companies and caterers have one thing in common: If they don't manage their work efficiently, nothing gets off the ground. Project-management software isn't just for large-scale manufacturing anymore.

🍁 **Microsoft Project 3.0** (\$695) should be shipping at about the time you read this. Project's strong suit has been its flexibility, and Microsoft has taken that even further in version 3.0. You can enter project information directly into a variety of views and create custom dialog boxes that contain only the fields you use most often. Like Excel 4.0, Project offers a customizable tool bar, and it even borrows some Excel features, including a Fill Down command and the ability to double-click on a column border to automatically set the best width for the column. 800-426-9400 or 206-882-8080. 🍁 **MacProject Pro** (\$599), from Claris (408-727-8227), should ship in the third quarter of this year. The



hottest new feature is the integrated outliner, which lets you brainstorm first and then use the outline data to fill a variety of charts and tables. MacProject Pro lets you open multiple documents, so you can create cross-project dependencies. MacProject Pro really shines in its data-sharing ability. You can attach a document from any application to a task and then automatically launch the application and open the document under either System 6 or System 7. The program's Exchange links let you export MacProject data into other analysis applications, such as FileMaker Pro or Excel, to create custom reports and charts automatically — again under System 6 or System 7.

Up to Date . . .

Atlas Pro 1.5, the latest version of Strategic Mapping's geographic-analysis package, incorporates its own command language, extended support for Apple events, and upgraded U.S. street data. 408-985-7400. \$795. 🍁 **Expressionist 3.0** is a major upgrade of Prescience's equation editor. New features include user-configurable palette buttons, text rulers, and expanded macro capabilities. 415-543-2252. \$199.95. 🍁 **FastTrack Schedule 2.0**, AEC Software's Gantt-chart maker, offers scheduled versus actual bars, percent-complete display/calculation, task-duration calculation, and customizable chart scales. 703-450-1980. \$279. ⌨

SpreadBase: Smart Spreadsheets

You know more about your data than your spreadsheet program does. Imagine this scenario: You've created a spreadsheet that summarizes your company's sales by region by month. Now suppose you look at the data and decide what you really need is to look at each month's sales by region. Too bad. With conventional spreadsheet programs, there's no easy way to do even this simple transformation, because spreadsheet programs aren't able to "understand" the relationships between categories ("regions" and "months") in a spreadsheet. This is exactly the problem SpreadBase was designed to solve.

SpreadBase is a new analysis tool that combines the look and feel of a spreadsheet program with the underlying power

of a relational-database engine. With SpreadBase, you categorize your data as you enter it, so creating different views of your data or setting up hierarchies and relationships among categories is easy — performing an analysis involves manipulating only the categories, not the data itself. What's more, because the underlying architecture is a database, any changes you make in one area of your analysis, such as adding a sales territory, automatically update throughout the data set.

Users who have had to wrestle with data from host databases will be especially pleased with SpreadBase, because it includes the ClearAccess technology for directly accessing host databases through a variety of APIs, including DAL. Some of the host databases supported include those created by ORACLE, Sybase, Ingres, and DB2. And for those who normally get their data from a spreadsheet or desktop database,

SpreadBase, from Objective Software, is a unique analysis tool that combines the ease of use of a spreadsheet program with the power of a relational-database engine.

SpreadBase can also import data in SYLK, dBASE, WKS, and tab- and comma-delimited formats.

SpreadBase comes as a fully integrated system. In addition to the analysis and connectivity tools, it provides charting capability and a complete report-generating function — all of which are tied to the data, so you can change the data and immediately see that change reflected in your report.

Objective Software, Inc., 248 Homer Avenue, Palo Alto, CA 94301; 415-324-3333. \$695.

Tektronix's Dye-Sub Printer

Going beyond the Phaser III PXi color printer (a.k.a. the crayon-jet), Tektronix has turned to continuous-tone color printing, introducing the Phaser IISD.

The Phaser IISD is the third announced printer to use a Sharp 300-dpi dye-sublimation printing engine, but it boasts several significant firsts, the most notable being true Adobe PostScript Level 2. It will ship with 16 megabytes of RAM on board, which Tektronix says is enough to print an 8-x-10-inch image without additional memory, thanks to some proprietary memory-management and image-compression techniques.

In addition, the Phaser IISD uses

Tektronix's Photofine technology, a suite of image-rendering algorithms that provide fine lines and text plus smooth colors and good color rendering when printing transparencies.

Powered by a 24-megahertz AMD Am29000 RISC chip, the Phaser IISD comes with LocalTalk, serial, and parallel interfaces; an EtherTalk interface is optional. Tektronix estimates the print speed at three and a half minutes a page for letter-sized prints and predicts a per-print cost of \$3.50.

Tektronix, Inc., P.O. Box 1000, MS 63-583, Wilsonville, OR 97070; 800-835-6100 or 503-682-7377. \$9,995.



Tektronix's Phaser IISD boasts several firsts for a dye-sublimation printer, including PostScript Level 2. It also comes with 16 megabytes of RAM, enough to print a full-page image without additional memory.

Now Utilities 4.0: Less Is More

Now Utilities has been shrinking ever since its first release. It started with 12 utilities and then dropped to 10; now version 4.0 has reduced that number to 7. One advantage is that the included programs are now more focused and more powerful, so less is indeed more — OK, fewer is more. The utilities included in the package are NowMenus, StartUp Manager, NowSave, Super Boomerang, WYSIWYGMenus, NowScrapbook, and Profiler. Version 4.0 requires System 7.

Because Now Software has adopted a policy of shared resources among modules, version 4.0 actually uses less memory than the previous version did while providing more functionality and a common interface.

The biggest changes have been made to NowMenus, which has absorbed many of the functions of the previous version's MultiMaster module. You can reorder the Apple menu by dragging, add separators to create visual groupings, and keep track of your most recently used files and folders in a menu on the left or

Radius' VideoVision

You've heard of books on tape. Well, files on tape — videotape, that is — may be the next thing, thanks to Radius' desktop video system, VideoVision. A combination 24-bit-display card and video in/out system, VideoVision lets you produce truly professional-looking video output directly from the Mac.

The VideoVision system consists of a NuBus card and an external breakout box. The breakout box provides two video inputs (composite and S-video) and two stereo audio inputs plus a stereo audio mix input, stereo audio output, and a single video output (composite or S-video). The box also offers a serial port, so VideoVision can provide device control without taking up your modem port. The card, however, is the important part of the equation.

The VideoVision card can function as a display card, driving monitors as large as 16 inches at 24 bits, but the real magic is what it can do with live video. The VideoVision system is the first reasonably priced desktop video device to offer flicker-free Mac-video output for display on NTSC monitors or for recording on tape. You can also resize a live-video window to any size without degradation of the image. It also offers on-the-fly standards conversion, so you can convert from NTSC, PAL, or SECAM input to NTSC or PAL output.

The card also offers two buses for expansion — the H-bus and the R-bus. The H-Bus is an open-spec video-specific bus that can be used either in daughterboard or side-by-side NuBus implementations. Designed specifically

for video, H-Bus gets around the NuBus transfer bottleneck by offering transfer rates as high as 60 megabytes per second. JPEG/MPEG compression/decompression cards will be among the first devices to take advantage of this bus.

The R-Bus is a full-duplex 24-bit Radius proprietary bus that also offers 8-bit alpha-channel support. Future R-Bus uses could include support for teleconferencing or for second video cards to run multiple video windows at various pixel depths.

For a limited time, Radius will bundle VideoShop, from DiVA, and Action, from Macromedia, with VideoVision.

Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; 408-434-1010. \$2,399.




Radius' VideoVision lets you create truly professional-looking video presentations right on your desktop. With the VideoVision system, you can produce flicker-free video output in a window whose size you can control.

right side of the menu bar. You can also change the font and size of the Apple menu's labels and the labels of its submenus (or only those of the submenus or those of all the menus in the menu bar). You can also create Worksets for your various projects, so you can view all of your related files as a single icon that automatically launches every document in a project. NowMenus also supports application substitution for those times when you don't have the originating application for a document.

Improvements to the other modules have been more subtle. StartUp Manager no longer renames extensions; it provides a list of all the links associated with an extension, and you can double-

click on control panels to open them directly. NowSave now captures keystrokes but intelligently removes repeated uses of the Delete key. Super Boomerang lets you directly open disks and windows and offers direct access to its Find function from the Open command. WYSIWYGMenus lets you assign specific font sets to applications and lets you rename entire font families or individual faces.

NowScrapbook (formerly known as PictureBook) is a new addition that lets you view, name, reorder, and edit graphics within the Scrapbook.

Now Software, 319 S.W. Washington Street, 11th Floor, Portland, OR 97204; 800-237-3611 or 503-274-2800. \$149. 

NewsLine

Reports and Analysis

Quorum Sues Apple

SAN FRANCISCO, CA — Taking preemptive action in case Apple loses its lawsuit against Microsoft and Hewlett-Packard and instead turns its big legal guns on smaller developers, Quorum Software Systems has filed a suit against Apple, seeking a judgment that Quorum's software does not infringe on Apple's patents or copyrights. Quorum's software, called Latitude, lets Mac-application developers port their applications to UNIX but without the Mac interface; instead users get a UNIX graphical interface. Apple has sent letters to Quorum alleging that Quorum developed its product by inducing other developers to violate their confidentiality agreements with Apple, thus violating Apple's patents and copyrights. Quorum denies the allegation.

RasterOps/Truevision Merge

SANTA CLARA, CA — After announcing, and then canceling, a merger a year ago, RasterOps and Truevision have decided the deal looked better the second time around and have agreed to merge the two companies after all. Truevision will become a wholly owned subsidiary of RasterOps. The deal, subject to shareholder approval, is scheduled for completion in August. The agreement calls for the issuance of 2.4 million shares of RasterOps common stock in exchange for all existing Truevision capital stock.

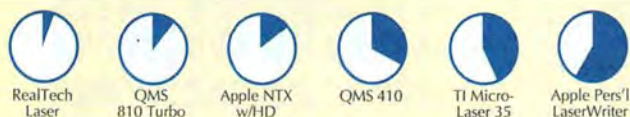
Brøderbund Buys PC Globe

NOVATO, CA — Brøderbund has agreed to buy PC Globe. PC Globe, which makes geography software, had originally agreed to be acquired by a Miami-based firm, Intracorp. However, Brøderbund sued to set aside that agreement.

RasterOps to Acquire RIPS

SANTA CLARA, CA — In its second big merger in a single month, RasterOps announced that it has signed a letter of intent to merge with Raster Image Processing Systems (RIPS), of Boulder, Colorado, for 60,000 shares of RasterOps common stock, making RIPS a wholly owned subsidiary of RasterOps. RIPS develops PostScript-emulation technology for use in printers, such as RasterOps' CorrectPrint 300.

DARE TO COMPARE.



Street prices:
 \$1695 \$3995 \$4295 \$1750 \$1749 \$1995

On average, the RealTech Laser performed 4 to 5 times faster than other PostScript® laser printers in its price range.

Visibly faster. The RealTech laser printers' high performance Weitek RISC processor prints complex documents 4 to 5 times faster than other non-RISC laser writers in their price range. ATM font rendering technology builds raw type characters 4 to 5 times faster. The RealTech uses a new version of the Sharp printer engine that prints 9 pages per minute.

Based on Adobe PostScript® Level 2...

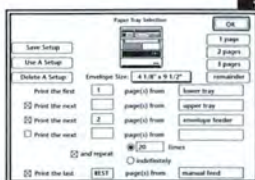
the next generation of Adobe's page description language, which has become the industry standard for defining pages of integrated text and graphics. It contains a number of performance, function and print quality enhancements that save printing time and improve quality. PostScript® Level 2 is compatible with all current application software that supports the PostScript® language. In addition, PostScript® Level 2 offers new capabilities, including forms handling, graphic patterns support, and new half-tone algorithms.



Elimination of fragmentation =
 memory allocated dynamically
 and automatically reclaimed

Genius-level memory.

One pool of memory is available for all resource needs. Memory is dynamically allocated and automatically reclaimed; no arbitrary memory restrictions exist. Disk space management is improved to eliminate fragmentation and improve transfer of information from the hard disk to RAM.



You can specify up to 4 paper changes from the menu — without ever leaving your chair!

The multi-user printer!

An ideal choice for multi-user printing environments. Second 250-sheet cassette feeder and tray are available (\$199); optional envelope feeder available for RealTech Laser only.



RealTech™ Laser

\$1695

Lease price: \$47/month

500% FASTER
 than non-RISC printers

- RISC processor
- SCSI port
- 9 pages/minute
- PostScript Level 2

NEW LOWER PRICE!
 We've sold so many of these award-winning printers that our manufacturing costs went down...so we're passing the savings on to you!

HOW REALTECH STACKS UP

PERSONAL LASER PRINTERS

	RealTech Laser	Apple LaserWriter IINTR	NEC Model 95	TI microLaser Turbo	GCC BLP IIs
Price	\$1695	\$2195	\$1749	\$2249	\$2499
Pros	Weitek RISC processor	Am29005 RISC processor	Motorola 68000	Weitek RISC processor	Motorola 68000
	9 ppm 8.5x11	4 ppm 8.5x11	6 ppm 8.5x11	9 ppm 8.5x11	8 ppm 8.5x11
	Optional 2nd paper tray	—	Optional 2nd paper tray	Optional 2nd paper tray	Optional 2nd tray
	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
	SCSI port	—	—	Optional SCSI port	SCSI port
	2 mb RAM (+8)	3 mb (+1)	2 mb (+3)	2.5 mb (+8)	2 mb (+2)
	PostScript Level 2	PS Level 2	PS Level 2	PS Level 2	PS Level 1
Cons	Only available through HARDWARE THAT FITS 1-800-364-USUR	No SCSI port	No SCSI port	Expensive options	Pricey
	4 ppm	4 ppm	6 ppm	Daughter board design	8 ppm
	Only expandable to 4 mb RAM	Only expandable to 5 mb RAM	Only expandable to 5 mb RAM	Upgradable to 10.5 mb, but not all memory usable for PS	Only expandable to 2 mb RAM
	No 2nd paper tray	No 2nd paper tray	No 2nd paper tray		

Optional env. feeder \$269

HARDWARE THAT FITS

610 South Frazier
 Conroe, Texas
 77301



TEXAS INSTRUMENTS

\$1249

Lease price: \$34/month

TI MicroLaser Plus.

300 dpi, HP LaserJet Series II emulation standard. 1.5 Mb RAM. 9 pgs./minute; 17 resident fonts; 3,000 pgs./month duty cycle. Optional accessories: 2nd paper tray, separate envelope tray.

\$3299

Lease price: \$91/month

TI MicroLaser XL Turbo.

Prints 16 pages/minute! 300 dpi with Adobe PostScript Level 2 and RISC-based processor. 2.5 Mb RAM. 16 pages per minute; 35 resident fonts; 25,000 pages per month duty cycle. Optional 2nd paper tray and SCSI interface.

TI MicroLaser Turbo.....

\$1939

Lease: \$53/mo.

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- 5 **90-day Deferred Lease**...no payment for 90 days; first and last payment in advance

Call today and we'll fax you a lease application.

*All leases are subject to credit approval. All lease payments in our ads are based on the "True Lease" program at 48 months. Prices, lease prices, and rates are subject to change without notice. **NOTE: Minimum lease payment is \$50 per month.**

Toll-free information: 1-800-364-LESS

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Printed on recycled paper to show our concern for the environment.



NEC Silentwriter Model 95

\$1469

Lease price: \$40/month

Micro-fine toner and NEC's patented "Sharp Edge" technology gives you sharp, black print quality.

300 dpi laser printer prints 6 ppm. 2 Mb RAM, Motorola 68000 processor, expandable to 5 Mb. Built-in envelope feeder and 250-sheet tray; feed or print consecutively or alternately. Resident language: Adobe PostScript Level 2. Automatic emulation switching. Optional second paper tray available.

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YOU CAN
CHOOSE
FROM THE
BIGGEST-EVER
SELECTION OF
HARDWARE VALUES!**



We want you to become a repeat customer. So we give you discount mail-order prices on 100s of hardware products...superior customer service...our unbeatable hassle-free warranty...toll-free tech support...and an unsurpassed return policy.

What's more, we do it all with a smile... because that's what you deserve.

WE GUARANTEE...*you'll be pleased with the power, performance, and competitive price of any of our products, which are:*

- Priced LESS than the comparable Apple product.
- Backed by a minimum 1-year warranty and our 30-day money back guarantee.

If you're not satisfied with what you buy from us, just call. We'll refund your purchase price (minus consumables, for printers).

Before returning merchandise, we must ask that you call our Customer Service Dept. to receive a returned merchandise authorization number (RMA). This number must be included with any printer you return. No C.O.D. returns, please. NOTE: Our ads originate entirely on Macintosh systems, from concept to film. Call us for more information! ”

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\$4495

Lease price: \$123/month

**Real
Tech™
Laser 400**

TWICE THE PRINTER! 400 dpi/ 11x17 printer

- High-speed printing (15 ppm, letter size)
- 8 ppm (tabloid size)
- 2 paper trays included!
- SCSI port
- Full Page 11x17 printing!

AGAINST THE COMPETITION

11x17 PRINTERS/HIGH-SPEED PRINTERS

	<i>RealTech Laser</i>	<i>QMS 2210</i>	<i>Hewlett-Packard IIIsi</i>
Price	\$4495	\$8995	\$6995
Pros	Weitek RISC processor	Motorola 68020	RISC-based formatter
	8 ppm 11x17	11 ppm 11x17	
	15 ppm 8.5x11	22 ppm 8.5x11	17 ppm 8.5 x 11*
	2 paper trays	Optional 2nd paper tray*	2 paper trays
	300 or 400 dpi	300 dpi	300 dpi
	SCSI port	SCSI port	
	4 mb RAM upgradable to 16	4 mb RAM	5 mb RAM upgradable to 17 mb
	PostScript Level 2	PS Level 1	PS Level 1
Cons	Only available through	Very expensive	Expensive
	HARDWARE THAT FITS	Limited to 300 dpi	Limited to 300 dpi
	1-800-364-USER	Poor paper handling	No 11x17 output; no SCSI port
		Slow for complex graphics; 4 mb RAM maximum	* Optional double-sided printing costs \$695; not practical for most applications
		* Optional paper tray \$115	

**RealTech laser
printers come
out on top in
performance,
features,
AND price,
every time.**

The ideal networking printer.

The RealTech Laser's and Laser 400's three interface ports (Appletalk® RS-422, IBM PC parallel, and RS-232-C) can be used simultaneously. They can be assigned either PostScript® or LaserJet II emulation, making it the ideal network printer. It switches automatically between interfaces and emulations, and spools files on a real-time basis. A Hewlett Packard LaserJet Series II emulation allows use with non-PostScript applications software.

Prints full-page 11x17 documents!

No more tiling to get the full image area, or taping letter-size pages together! The RealTech Laser 400 is the optimum tabloid printer.

SCSI port. The standard configuration includes a SCSI port and 2 Mb of RAM upgradable to 10 Mb (RealTech Laser) or 4 Mb of RAM upgradable to 16 (RealTech Laser 400).

Money-back guarantee.

Our famous 30-day money-back guarantee backs these products. If you're not completely satisfied, we'll refund your purchase price, minus consumables. RealTech laser printers are also backed by a one-year warranty.

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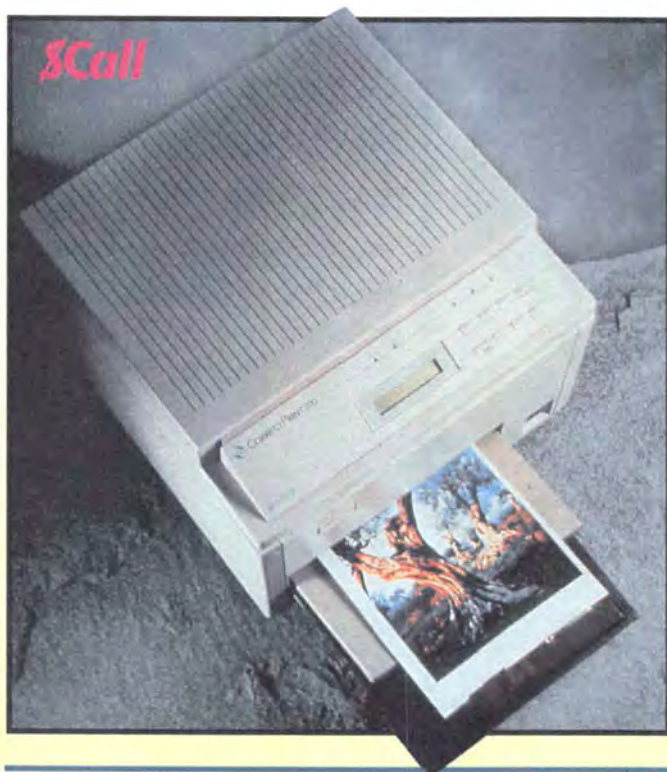
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RasterOps

CorrectPrint 300

**Photographic-quality proofs
for around \$5 a page!**

*(With our leasing program, you can afford
leading-edge desktop color technology.)*

The highest-quality color available in desktop color proofing technology. The RasterOps CorrectPrint 300 uses a four color (CMYK) dye-sublimation thermal printing process at 300 dots per inch. The result is a continuous-tone print that resembles photographic-quality output.

The CorrectPrint 300 prints on special sheet-fed paper or transparencies, not on rolls. For best output, special coated paper is required. It uses a RISC controller with JPEG decompression capability. The CorrectPrint 300 comes with 0Mb RAM, 12 Mb RAM is required, and it is upgradable to 36 Mb RAM.

It's Adobe PostScript® language compatible, and includes three interfaces as standard: AppleTalk, Ethernet, RS-232C, plus a SCSI port, allowing users to share the ColorPoint among Macs, PCs, workstations, or a network. 35 resident fonts.



Seiko Instruments ColorPoint PSX

\$6795

Lease: \$186/mo.

It's fast! Prints on roll-fed paper or roll-fed transparency to within 1/4" border on all sides, ensuring that the full-color image is printed without reducing the image size. 300 dpi color thermal printer uses 25 MHz RISC processor. 6 Mb RAM standard, upgradable to 34 Mb. Adobe PostScript® language compatible. Download, process and print images simultaneously; it has multiple frame buffers. Includes three interfaces as standard: AppleTalk, Centronics, and RS-232, plus a SCSI port, allowing users to share the ColorPoint among Macs, PCs, workstations, or a network. The printer continuously polls all interfaces and re-configures automatically to receive incoming data. 39 resident fonts.

Seiko Instruments ColorPoint PS.
Same specifications as the PSX, but
with a 16 MHz processor. 6 Mb of
RAM standard, upgradable to 34 Mb.

\$5295

Lease: \$145/mo.

Seiko Instruments Personal ColorPoint PS

High quality color! 300 dpi color thermal printer can produce full-bleed comps on plain paper or transparencies. B4 page size allows printed image of 8.53" x 11.93". 6 Mb RAM upgradable to 10 or 22 Mb. 39 resident fonts, 16 MHz RISC processor.

Seiko Instruments **\$175** Smart Label Printer Plus

Can print bar-coded labels. Takes less desk space than a Rolodex® file. Prints labels for envelopes, file folders, diskettes, notebook covers, file cards, name tags, and more. Bar-coding capability makes it useful for tagging low-volume inventory. Includes software (with its own database, text editor and bar-code generator), serial cable and 130 self-adhesive labels.



CoStar Label Printers

AddressWriter.....**\$469**
LabelWriter II.....**\$189**

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Lease price: \$165/month

RealTech™
Color 350

**Where else would you
find such a high-quality,
affordable color printer?**

High-speed thermal printer produces edge-to-edge comps on 11x17 or smaller paper...

300 dpi thermal transfer technology prints quality color or monochrome output. 10 Mb standard; upgradable to 18 or 34 Mb. Three interface ports (RS-232, parallel, and Appletalk®) can be used simultaneously. Includes 39 resident Bitstream fonts.

Brilliant, saturated color at 300 dpi

Adobe PostScript® compatible...perfect for graphic arts applications, publishing, business presentation graphics, and more. 4 scanning passes; Pantone-approved color palette. Includes printer tray and sheet feeder.

**Prints on BOTH sides of
thermal or plain laser paper!***

- Easy-access front control panel
- 300 dpi
- 10 Mb of RAM
- SCSI port
- Largest "live" image area of any cut-sheet printer

* The RealTech Color 350 uses state-of-the-art thermal technology, which allows you to print on both sides of thermal paper, or on both sides of high-quality, smooth finish plain laser paper. (Use thermal paper or clay-coated paper for optimum output quality and consistency.) Call for more information.

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30-DAY MONEY-BACK GUARANTEE. Before returning merchandise, we must ask that you call our Customer Service Dept. toll-free to receive a returned merchandise authorization number (RMA). This number must be included with any products you return. No C.O.D. returns, please. Thank you for your cooperation.

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SPREADSHEETS

Microsoft Excel 4.0

Microsoft waxes cold on the features war and hot on usability with Excel 4.0.

Like a world-class athlete, Microsoft seems to thrive on perfecting its game as much as on competing with its rivals. Only one year after shipping the last major release of its best-selling spreadsheet program, Excel, Microsoft has completed version 4.0, an impressive revision that successfully leverages a fairly narrow but key focus — making more accessible the small number of features that get the most use.

Auto-Spreadsheet

Whether you're a power user or a spreadsheet dilettante, chances are you spend a lot of time fussing with your data to make it look presentable on a worksheet. Microsoft has added an AutoFormat feature that should make format fussing a thing of the past. Now you can simply select a group of cells, and Excel will automatically apply an aesthetically pleasing format to it.

In addition, you can accomplish many everyday operations in Excel 4.0 simply

by dragging. For example, you can select a group of cells and drag them to a new position. Even more useful is the AutoFill feature, which can intelligently create a data series for you. By typing Region 1 into a cell, pressing Enter, and dragging the fill handle (a small square) across several rows or columns, for example, you can get Excel to fill in the appropriate labels — Region 2, Region 3, and so on.

Furthermore, if you select two cells that contain the numbers 10 and 20 and then use the fill handle to drag a selection, Excel will fill subsequent cells with 30, 40, 50, and so on. Excel even recognizes some words — if you type in the labels June and July, you can use AutoFill to complete the monthly labels for your data series. You can also use this feature to clear cells quickly by selecting a large area on a worksheet and then dragging the fill handle to reduce the size of the selected area (the Undo command works in case you drag too far).

With its multiple customizable tool bars, you can tailor Excel 4.0 to fit your work style. You can open the tool bars as resizable floating palettes or dock them on one side of your screen. You can even mix and match buttons among tool bars and add macro buttons to them. If you don't like the look of a button, you can design your own button face in a drawing program and paste it onto the button.

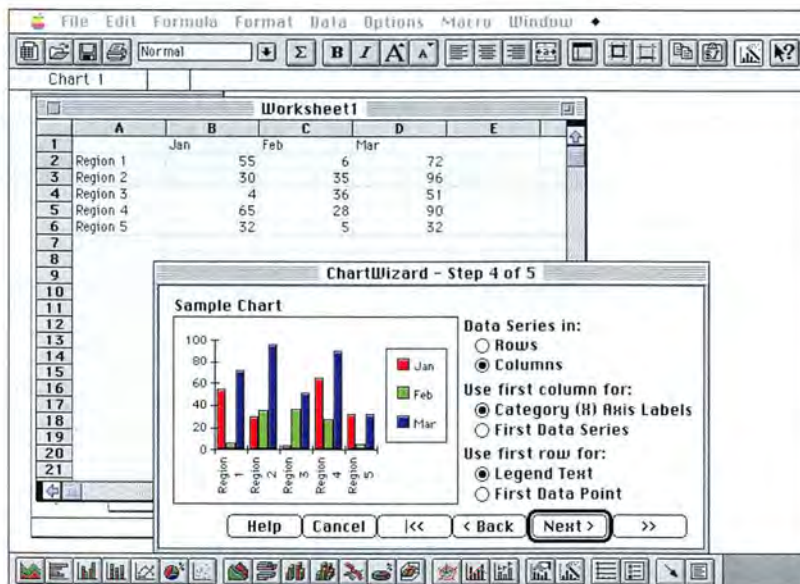
Excel 4.0 makes it even easier to access commonly used commands than the previous version did. If you hold down the Option and Command keys and click on an object, Excel brings up a pop-up menu that contains commands relevant to your selection, whether you're clicking on a worksheet, tool bar, chart, or graphic object. Excel's Command-Option-click combination can't be modified, and it may conflict with some third-party utilities, but in most cases, you can reprogram your utilities to use other key-stroke combinations. Another new time-saver is the ability to close all open documents with a single command.

Undergoing Analysis

If you regularly construct complex spreadsheet models, several new tools in version 4.0 should make your life easier. The Scenario Manager is an add-in macro for what-if analysis that lets you specify multiple cells as variables. As you run different scenarios on your data by changing the input values of the cells, a summary-report function enables you to draw comparisons among them. For complex what-if scenarios, Excel 4.0 lets you define custom dialog boxes as well as simple macros.

Excel 4.0's new Workbooks ease the process of organizing and navigating related spreadsheet files. When you create a Workbook, you're actually creating a new file format that's capable of holding multiple worksheets, charts, and macro sheets. A Workbook table of contents lets you easily navigate the related documents, and you can share the entire collection with coworkers as a single Workbook file rather than as an unwieldy hodgepodge of separate files. To reverse the process, you can unbind documents from Workbooks and use them as standalone worksheets, although you can still reference them through a Workbook's table of contents.

Anyone who has struggled with Excel 3.0's charting module probably has new charting features at the top of their wish



Excel 4.0 concentrates on making existing features more accessible, with good results. ChartWizard, shown here, guides users through the perilous process of chart building.

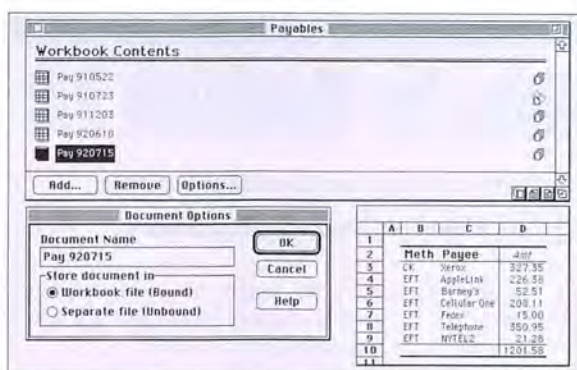
list for version 4.0. The good news is that version 4.0's ChartWizard makes charting easier. The bad news is that the program has maintained its original charting architecture, which means you can place a chart on a worksheet but must still open the chart in a separate window to edit it.

To ease the chart-building process, ChartWizard guides you through it, step by step, with dialog boxes that provide graphic explanations for each step as well as access to Excel's help system. If you've already mastered Excel's charting idiosyncrasies, you can bypass ChartWizard by using a fast-forward button. Other useful charting enhancements include a dialog box that lets you view the ranges you're selecting as you edit a chart's data series and the ability to click on 3-D charts and rotate them directly rather than manipulating them through a secondary dialog box.

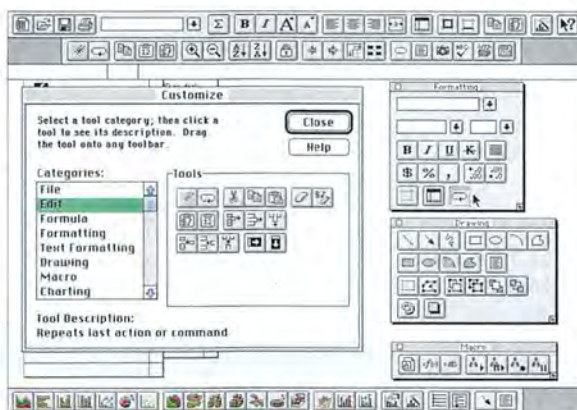
Also-Rans

In addition to the major enhancements in Excel 4.0, several minor improvements also bear mentioning. You can now create and print reports that consist of multiple worksheet views and scenarios, and a new Print to Fit command lets you print worksheets of a specific size or length. The Crosstab reporting feature makes it easy to summarize data from Excel databases. Excel 4.0's QuickTime support lets you create animated charts from complex data sets. And the Excel 4.0 Software Development Kit (available separately) provides developers with information on how to make use of Excel 4.0's rich Apple-events support.

Excel's context-sensitive on-line help system is one of the best we've seen. After you've selected the help icon on the tool bar, you can click on any object or tool on-screen to call up the appropriate information. Every dialog box is equipped with a Help button, and a search feature makes it easy to find a particular topic. Each topic has a pop-up window with information on shortcuts and special techniques as well as hypertext links to other topics. In addition, you can print any topic and set up bookmarks for subjects you consult frequently. The Back button lets you retrace your steps through every one of the topics you've viewed. Excel 4.0's printed documentation is also an improvement — it's less bulky and is organized into fewer books than version 3.0's documentation was.



A table of contents makes it easy to navigate Excel 4.0's Workbooks, which group related worksheets, charts, and macro sheets into one easily managed file. You can also "unbind" Workbook documents and use them as stand-alone worksheets.



Excel 4.0's multiple customizable tool bars let users tailor the program to suit their individual work style.

PowerBook users can install on-line help and leave the documentation at home. The help file's massive size — 1,657K — is the only drawback. Moreover, if you install everything Excel 4.0 offers, you'll need nearly 9 megabytes of storage!

Microsoft's extensive usability testing has clearly paid off — Excel 4.0's near-flawless interface design is proof positive of its effectiveness. However, we still have a few items on our wish list. Many of Excel 4.0's new features are implemented through add-ins, which must load and configure themselves before you can execute them. As a result, response is sluggish for some commands. We hope future versions will be smarter about which add-ins to preload at launch. We'd also like to see the addition of a macro compiler or tokenizer, which would improve the execution speed of complex macros.

The Bottom Line

We applaud Microsoft for eschewing the features war in favor of making Excel 4.0 easier and more comfortable to use than previous versions. The Auto-

Format and AutoFill time-savers alone should significantly boost users' productivity. Moreover, it may be safe to assume that Microsoft has turned its attention more to attracting new users to spreadsheet programs than to stealing its competitors' customers. If that's so, then chalk one up for the Redmond usability team. If you've never used a spreadsheet program before and you're looking to get the most power for your money, Excel 4.0 is an excellent choice. If you're already an Excel user, you won't want to skip this upgrade.

— Louis E. Benjamin, Jr.

Get Info

Microsoft Excel 4.0

|||||

Published by: Microsoft Corp.,
One Microsoft Way, Redmond,
WA 98052; 206-936-3227.

Version: 4.0.

List Price: \$495.

UTILITIES

Norton Utilities for Macintosh 2.0

State-of-the-art data-recovery tools make Norton Utilities 2.0 indispensable for hard-disk owners.

The latest upgrade of the Macintosh's most popular disk-repair and data-recovery package won't dazzle users with innovation, but it does give them more for their money than the previous version did. Norton Utilities for Macintosh 2.0 features state-of-the-art recovery tools, new backup options, and a suite of enhanced security and disk-organization utilities borrowed from the now-defunct SUM (Symantec Utilities for Macintosh) package.

Mr. M.D.

Norton Utilities' essential diagnostic and repair utility, Norton Disk Doctor, packs even more muscle in version 2.0 than it did in the previous version. Disk Doctor can now handle a wider variety of situations involving damaged volumes (drives as well as partitions). In addition, Symantec has increased the program's data-recovery success rate by beefing up Disk Doctor's UnErase and Format Recover commands.

Also substantially improved is FileSaver, a control panel that tracks deleted files, stores volume-backup information, and saves comments during desktop rebuilding. The data that FileSaver records is essential to the package's ability to restore erased files and recover data from damaged disks. FileSaver can now update its data at user-specifiable intervals or on demand through the use of a hot key. This feature will have special appeal to network administrators, because the previous version's updates on restart weren't useful for servers. Other new options also let you designate the circumstances under which FileSaver updates are performed. PowerBook users, for example, can set FileSaver to perform updates just before their PowerBook goes to sleep.

Speed Disk, Norton's volume-optimization utility, is improved in version 2.0 to allow the defragmentation of the current startup volume. The previous version didn't allow operations on startup volumes, with the exception of scans to

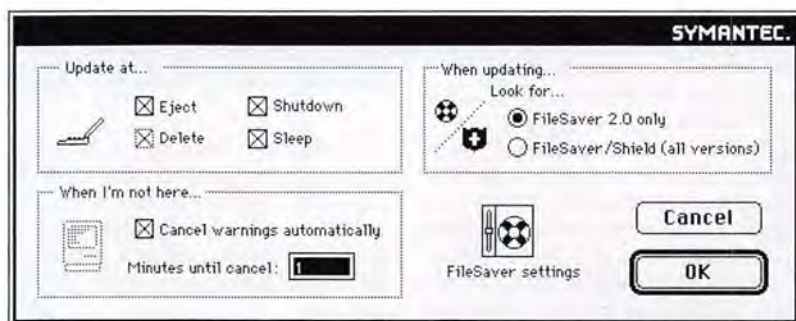
determine fragmentation. Defragmentation guarantees that all files are stored contiguously on a volume.

Optimization takes defragmentation one step further and moves all files toward the beginning of the volume, thereby creating a large contiguous free space. As with the previous version of Speed Disk, the optimization process can be prioritized, so files that aren't frequently altered (system files, control panels, and extensions, for example) are located closer to the beginning of the volume than frequently used files are. As a result, frequently used files are closest to the free space on the volume, which

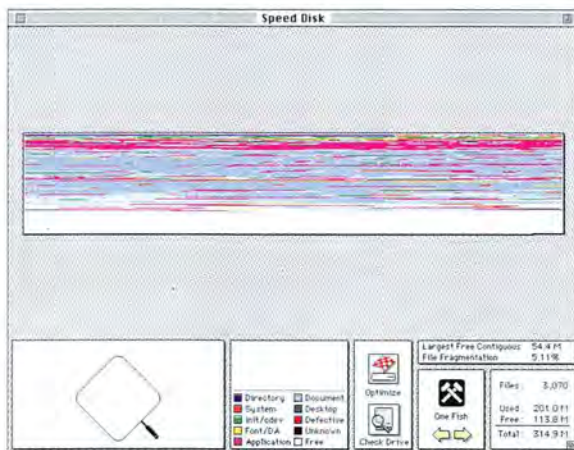
allows them to grow with less likelihood of fragmentation.

Revamped completely in version 2.0 is Norton's Directory Assistance, one of the most comprehensive directory-dialog-box extenders currently available. On a menu bar that it adds to each Open, Save, and Save As dialog box, the utility lists your most recently accessed files and folders and lets you specify any files and folders you want listed permanently. You can also control the sorting order of the list, find files and folders (Directory Assistance uses the same high-speed search engine as Norton's Fast Find tool does), and create new folders—all without returning to the Finder.

The Fast Find DA, a carryover from version 1.0, was originally designed to outperform System 6's Find File DA. Version 2.0's Fast Find continues the tradition by outclassing System 7's Finder. Fast Find quickly builds a list of files and folders that match user-specified search strings. You can inspect each found item by choosing Get Info,



In addition to new backup and security options, Norton Utilities 2.0 features numerous enhancements to existing features. With the new FileSaver options, for example, PowerBook users can set the utility to perform updates just before their PowerBook goes to sleep.



Norton Utilities' Speed Disk, which graphically displays the allocation of files on a volume as well as the total degree of fragmentation, is enhanced in version 2.0 to allow the defragmentation of the current startup volume.

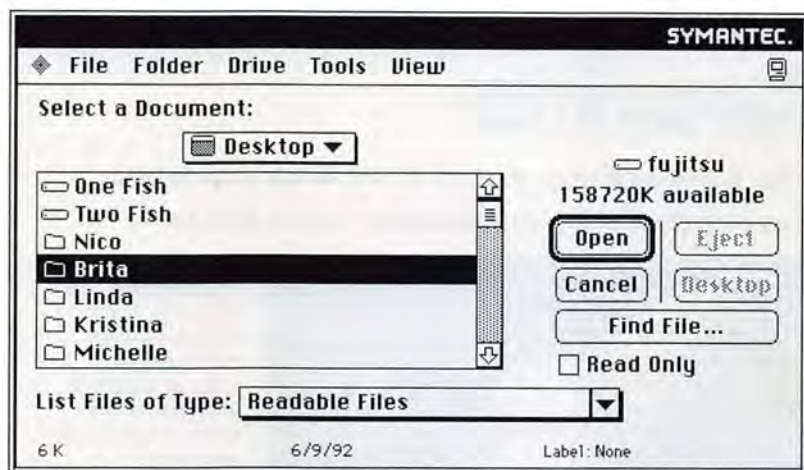
which lets you determine the file's origin, or by looking at the contents of the file with Fast Find's viewer. To display the file's icon and the directory in which it resides in the Finder, you can simply Option-double-click on the file's name in Fast Find's list, causing an Apple event to be sent to the Finder.

In addition to enhancements to existing features, Symantec has added several new tools to the Norton Utilities package, including timed-backup capabilities. Norton Backup lets you back up files to floppies or to a single large file (for example, to a file that resides on a server), and it can optionally compress the data. Once you've specified the backup medium and the files, folders, and volumes you want to back up, you can save the settings. If you need to perform regular unattended backups, you can use Backup's scheduling feature to set times for either incremental or full backups. The Norton Backup extension can automatically start a backup for you or send you a reminder to back up at a set time.

By incorporating tools from the SUM package, Norton Utilities has grown in breadth to include several serviceable security and disk-organization tools. The Floppier utility, which was completely rewritten for Norton 2.0, lets you store complete representations of floppy disks in a file on your hard disk, making it an excellent tool for mass formatting and duplication of floppy disks.

One drawback to Floppier, however, is that its file format is incompatible with Apple's DiskCopy utility. Still, Floppier offers one advantage over DiskCopy. DiskCopy files are always the size of an entire floppy disk, whereas Floppier files contain only used sectors of the disk. Empty sectors are not saved, which generally reduces the size of Floppier image files. If you don't need compatibility with DiskCopy, Floppier is an excellent tool.

The new Norton data-security tools are Wipe Info and Norton Encrypt. Wipe Info is the antithesis of everything Norton Utilities has stood for in the past. Rather than excelling at rescuing files, this utility excels at permanently erasing files, volumes, and free space on volumes, by overwriting specific areas. Normally, when files are deleted, the directory information is erased but the data itself remains. Wipe Info ensures that the data as well as the directory information is destroyed. Not even Norton Utilities'



Although Norton Utilities' Directory Assistance II takes a backseat to the package's data-recovery tools, it's still one of the most comprehensive file-management utilities currently available.

data-recovery tools can restore data once it's been wiped out with this tool. System 7 users can take advantage of Wipe Info's ability to create a Wipe Info Trash, which operates much like the System 7 Trash, except that any files dragged onto it are permanently erased.

Norton Encrypt is an application that lets you encrypt and decrypt files with either Norton's own proprietary algorithm or with the DES (Data Encryption Standard) method. Under System 7, you can drag and drop files or folders directly onto Encrypt to either encrypt or decrypt them.

Norton's security features are a nice windfall, but most users who require fairly stringent security measures will probably be better off investing in a standalone security package.

The Norton Partition feature, also taken from SUM, lets you create large invisible files, called soft partitions, that reside within the hard partitions on your hard disk. By partitioning a high-capacity disk that stores many files, you can significantly shorten the time it takes to locate files. However, soft partitions have their pros and cons when compared with hard partitions, which are created with hard-disk-formatting utilities. Data in soft partitions may not be easily recoverable if the hard partition crashes. Separate hard partitions, on the other hand, are likely to remain unharmed when other partitions go down. Version 2.0 of Norton's recovery tools provides extra support for Norton soft partitions to improve the chances of recovering their contents after a crash.

In general, soft partitions are more flexible and convenient to set up than hard partitions. You can create, delete, and expand them on the fly, which you can't do with hard partitions. Norton Partition lets you encrypt all the data in a partition — some hard-partitioning utilities also provide this feature, which provides an extra degree of security, but be forewarned that it also makes recovery from serious crashes virtually impossible.

The Bottom Line

Norton Utilities for Macintosh 2.0 is a solid collection of data-recovery and productivity tools, teamed with several backup and security options. Although the latest version doesn't win any prizes for innovation, as did the first version of the program, we highly recommend it. Norton Utilities for Macintosh provides an invaluable safety net for your data — no serious hard-drive user should be without it.

— Stephan Somogyi

Get Info

Norton Utilities for Macintosh

★★★★½

Published by: Symantec Corp.,
10201 Torre Avenue, Cupertino,
CA 95014; 408-253-9600.

Version: 2.0.

List Price: \$149.

OUTPUT DEVICES

AddressWriter

The AddressWriter makes short work of printing envelopes, but its talents don't come cheap.



CoStar's AddressWriter is a nifty, but pricey, envelope printer. Fortunately, an optional LocalTalk interface lets you share the device on a network.

If you need to print a lot of envelopes but aren't up to wrestling with a dot-matrix or laser printer, CoStar has an alternative called the AddressWriter, a dedicated envelope printer that promises to eliminate the hassle of printing envelopes with traditional printers. Laser printers require that you feed envelopes manually unless you buy a costly feeder. Even more problematic is the printer's heated fusion rollers, which tend to melt the envelopes' adhesive, producing a nicely printed — but sealed — envelope. Dot-matrix printers aren't much better — they don't seal envelopes, but they also generally require manual feeding or a special attachment.

Pricey Solution

The AddressWriter solves the envelope-printing dilemma, but at \$595, it'll need to print a lot of envelopes to justify the cost. An unusual-looking X-shaped device with a small footprint (8.5 inches wide by 8 inches deep), the AddressWriter comes with a bin for catching printed envelopes, but the bin hangs off the edge of a desk. This means that you must place the printer on the edge of a surface that's raised at least a foot above its surroundings. Behind its space-age

exterior is a fairly ordinary 8-pin dot-matrix printer with 144-dpi resolution.

The AddressWriter's feeder holds 100 standard #10 envelopes or about 200 postcards. It takes about 30 seconds to print a mailing address and a return address on a #10 envelope, and one ribbon prints about 1,000 envelopes. CoStar recommends using either TrueType fonts or ATM with PostScript Type 1 fonts for the best results.

The printer connects directly to a Mac's serial port, meaning that it ties up a serial port and limits the printer to use with a single Mac. However, an optional

\$199 LocalTalk interface box lets you put the AddressWriter onto a network, which is ideal if you already have a printer and a modem hooked up to your Mac or if you want to share the AddressWriter among several Macs.

Once you've attached the printer to your Mac via a LocalTalk or direct serial connection, you must install the AddressWriter software, which uses Apple's Installer. Unfortunately you can't customize the installation: The program disk installs not only the AddressWriter program and DA but also the AddressWriter serial driver, whether you want it or not. The AppleTalk driver comes on a separate disk with its own Installer. Both Installers insist on installing yet another copy of TeachText. You can print to the AddressWriter from any application simply by selecting the printer in the Chooser. The Page Setup dialog box lets you select from a variety of common envelope sizes, and you can have the printer "read" an envelope's size by running the envelope through the printer. However, the AddressWriter application and DA provide the most convenient means for printing envelopes.

The application uses three windows: one each for an envelope template, an address list, and a mailing address. In the template window, you can choose a variety of common envelope and postcard sizes, control the position of the mailing and return addresses, choose whether to print postal bar codes, and include optional graphics such as a company logo. You enter and edit addresses in the mailing-address window, and saving an address adds it to the address list. You can also import address lists from other applications in a variety of formats, including tab-delimited text. You can use multiple address lists, but you can have



The AddressWriter DA uses three windows: an envelope template for layout, an address-list window, and a window for entering and editing address information.

only one open at a time. Each address list is sorted alphabetically or by ZIP code, but printing choices are limited to the current address or the entire list — you can't select a range for printing or set up subsets of the list.

The DA, a scaled-down version of the application, opens automatically to the last-selected envelope template and address list, but you can select alternative templates or lists from pop-up menus. One nifty feature lets you copy an address from another application to the Clipboard; open the AddressWriter DA; and have the address transferred automatically to the envelope, ready to print.

One annoying aspect of the AddressWriter is that when you have it selected in the Chooser, all your applications default to a page size that's equivalent to the selected envelope size. In order to get proper pagination in your word-processing application, for example, you must remember to go back to the Chooser and select your standard printer. Apple's forthcoming drag-and-drop printing features will largely eliminate this situation, but for now, you're stuck with it.

The Bottom Line

No one will argue against the superior qualities of the ubiquitous laser printer — it's fast and quiet, and it produces good print quality. However, when it comes to printing envelopes, neither the laser printer nor the dot-matrix printer wins any accolades. CoStar's AddressWriter is a good solution, but at \$595 for the single-user version, it's pricey. An optional \$75 label feeder increases its versatility, but it's still too costly for casual use. The AddressWriter is most viable as a shared network resource, with the addition of the \$199 LocalTalk interface. If you print many envelopes, this gadget can make your life easier.

— Bruce Fraser

Get Info

AddressWriter

\$\$\$ 1/2

Manufactured by: CoStar Corp.,
22 Bridge Street, Greenwich, CT
06830; 203-661-9700.

List Price: \$595; LocalTalk
interface kit, \$199; label feeder,
\$75.

FILE & DISK MANAGEMENT

HAM, HAND-Off II, and On Cue II

Three System 7 file-management utilities aim to boost productivity.

File-management utilities are a sure-fire way to boost your Mac productivity. We tore apart three of the most recent offerings — HAM, HAND-Off II, and On Cue II — to find out how each utility goes about speeding the process of accessing files and applications and how their techniques differ. When the dust cleared, we found that despite the quality of their design, not one of these System 7 utilities can match the economy and range of functionality of Now Software's blockbuster Now Utilities package, although HAND-Off II managed to come up with one very valuable feature missing from Now Utilities and On Cue II's file-search feature is a standout.

HAM

HAM stands for Hierarchical Apple Menus, and that's exactly what it creates. Under System 7, items in folders that reside within the Apple Menu Items folder become readily accessible from the Apple menu as hierarchical submenus, so you don't have to double-click on every folder in a path to get to the file you're looking for.

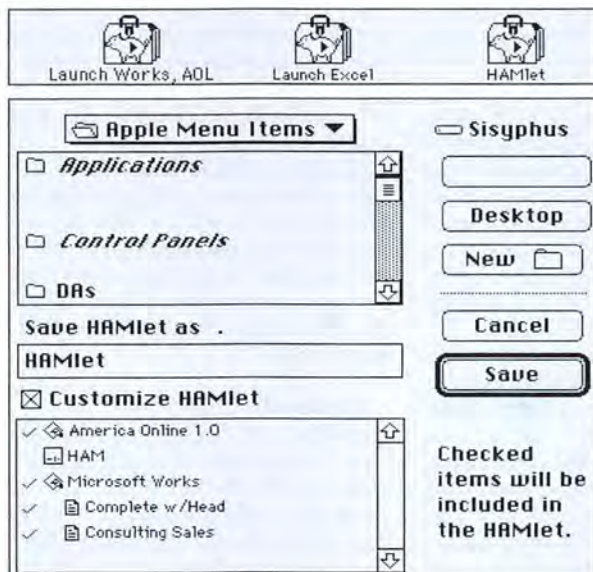
In addition, HAM can create a Recent

Items folder on the Apple menu that contains your most recently used applications, files, and folders. A handy control panel lets you change the order in which your Apple-menu items are listed, and you can elect to show or hide individual items.

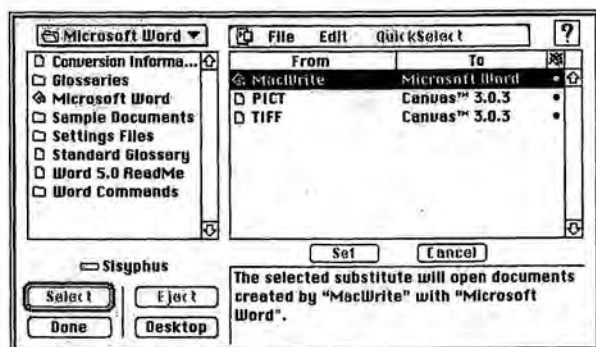
HAM mimics the functions of CE Software's Tiles with HAMlets, which are icons that you access from the Apple menu, from the desktop, or from within any folder. A HAMlet is designed to let you re-create your desktop as it exists at any time, so that when you double-click on the icon, it opens everything that was open at the time you created the HAMlet. As a result, HAMlets can simultaneously launch multiple files and applications.

HAND-Off II

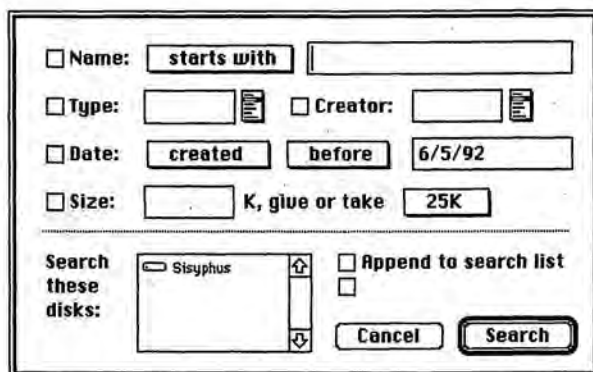
HAND-Off II has three main missions. The most important one is its unique ability to wipe out the "Application is busy or missing" dialog box. If you attempt to open a file that was created in an application that is unavailable, the utility automatically opens it in another application that's both available and compatible. Second, the program provides a



HAM's HAMlets are icons that can re-create a specific desktop arrangement and launch multiple files and applications simultaneously.



HAND-Off II's application substitution is an invaluable feature that lets you open a file in an application other than the source.



On Cue II's most noteworthy feature is a powerful file-search function.

separate Launch menu that's similar to those of On Cue and Now Utilities' MultiMaster. Finally, its SuperMenu feature makes the System 7 Apple menu hierarchical.

HAND-Off's application substitution can be a real hard-disk space saver, because you don't need to keep as many applications available just to open files. For example, with HAND-Off you can set up your system so that all MacWrite, TeachText, Microsoft Works, and text documents open automatically in Word and all PICT, TIFF, and paint files open in Canvas. A special HAND-Off dialog box lets you make on-the-fly substitutions when you attempt to open a file created by a missing application. In addition, from then on, HAND-Off automatically uses the substitute application you specified whenever you open the same type of file (you can edit substitutions in HAND-Off's control panel).

You can configure HAND-Off's Launch menu to provide easy access from your menu bar to files, folders, folder aliases, and applications. You can even create groups of files and applications, called Briefcases, and launch everything in a Briefcase from the menu. Files attached to applications or in Briefcases appear as hierarchical submenus, and

submenus can be as many as five levels deep. When you're switching among applications, HAND-Off remembers the speaker-volume and color-depth settings for each application and adjusts them on the fly.

HAND-Off's SuperMenu is similar to HAM's Apple-menu utility, but in our tests, HAND-Off's utility offered faster access. Missing in both HAM and HAND-Off, however, is the ability to display installed Chooser extensions on a submenu of the Chooser, a feature that's included in Now Utilities' NowMenus. This option makes for fast and easy printer switching.

Finally, we found HAND-Off's AutoHide feature to be a real improvement over System 7's ability to hide the windows of background applications. Without AutoHide, hidden applications reappear whenever you switch applications; AutoHide keeps all background applications hidden.

On Cue II

On Cue II provides a menu-bar item for file and application launching that's similar to HAND-Off's. It also lets you group files and applications for launching, although it calls the groups MultiSets rather than Briefcases. You can't

install folder aliases on your launch menu, as you can with HAND-Off, but On Cue's folders organize the menu's contents into convenient submenus. On Cue also doesn't adjust speaker volume or color depth as you switch applications, but it does track your most recently used files and folders for fast access.

A feature called On Disk creates pop-up menus in the standard Open and Save dialog boxes that let you create new folders; perform file-management functions such as duplicate and rename; and find files, folders, and disks. A powerful search feature lets you find files by name, type, creator, size, or date modified.

On Cue has five extension modules. KeyLauncher lets you launch files simply by typing all or part of the filename into a dialog box and clicking on the Launch button. MatchMaker performs application substitution similar to that of HAND-Off, except that you must preconfigure substitutions in the MatchMaker dialog box rather than on the fly when you open the file. The Quitter dialog box lets you quit from background applications without switching to them first. Restart and Shut Down work just as their counterparts on the desktop's Special menu do, but from within applications.

On Cue's QuickFinder DA can display all currently available files of a specified type (such as an application). Many standard types are preinstalled, but you can add others. Typing the first few letters of the name of the file you're searching for jumps you to the filename, and you can launch the file either by pressing Return or by double-clicking. QuickFinder is an especially convenient and unique way to find and launch files.

Last but not least, On Startup is an extension manager similar to INITPicker. At bootup, you can enable or disable individual extensions and control panels, change the order in which they load, and save preconfigured sets for special purposes. Like INITPicker, On Startup automatically disables any extension that it suspects may cause a system error, although in our tests, this feature occasionally disabled extensions for no apparent reason.

The Bottom Line

If you're running System 7, you've probably already noticed a significant boost in your productivity. By adding a System 7 utility, you'll get even more out of your Mac. All three of the file-

management utilities reviewed here are well designed and can improve your productivity. HAM is a stable performer, although its only unique feature is HAMlets. HAND-Off II boasts application substitution and the most fully featured launch menu of the three programs plus a utility that makes your Apple menu hierarchical. However, it lacks a startup manager and the ability to track recently used files and folders. On Cue II's launch menu and application substitution are a bit less robust than HAND-Off's, but the utility boasts a startup manager as well as a superior file manager and powerful search capability. You'll need to use it in conjunction with HAM or NowMenus, however, if you want a hierarchical Apple menu.

All in all, Now Utilities' NowMenus, Super Boomerang, MultiMaster, and Startup Manager give you most of the functionality of HAM and On Cue plus six other useful utilities to boot. With Now Utilities, the only features you'd be missing are HAND-Off's excellent application substitution and On Cue's powerful file-search function.

— Darryl Lewis

Get Info

HAM

★★★★

Published by: Microseeds Publishing, Inc., 5801 Benjamin Center Drive, Suite 103, Tampa, FL 33634; 813-882-8635.

Version: 1.0.

List Price: \$99.

HAND-Off II

★★★★

Published by: Connectix Corp., 2655 Campus Drive, Suite 100, San Mateo, CA 94403; 800-950-5880 or 415-571-5100.

Version: 2.2.5.

List Price: \$99.

On Cue II

★★★★½

Published by: Icom Simulations, Inc., 648 S. Wheeling Road, Wheeling, IL 60090; 708-520-4440.

Version: 2.0.1.

List Price: \$99.95.

OCR

Typist Plus Graphics, ScanMan Model 32, and LightningScan Pro 256

The Typist Plus Graphics bests the competition as a double-duty OCR and image-processing tool.

When Caere first introduced the Typist, a unique hand-held scanner designed for OCR, the product generated less than rave reviews. Two recent developments have helped to improve the Typist's image, however. Caere's new model, the Typist Plus Graphics, does double duty for OCR and image processing, so it's a more versatile tool. In addition, compared with the latest entries in the hand-held-OCR/image-processing field — Logitech's ScanMan Model 32 and Thunderware's LightningScan Pro 256 — the Typist Plus Graphics' relative speed and ability to scan text directly into documents allows it to come up smelling like a rose.

Typist Plus Graphics

To use the Typist Plus Graphics, you launch the Typist software from the Apple menu, open an application such as a word-processing or page-layout program (any program that accepts keyboard input should work with the Typist), and

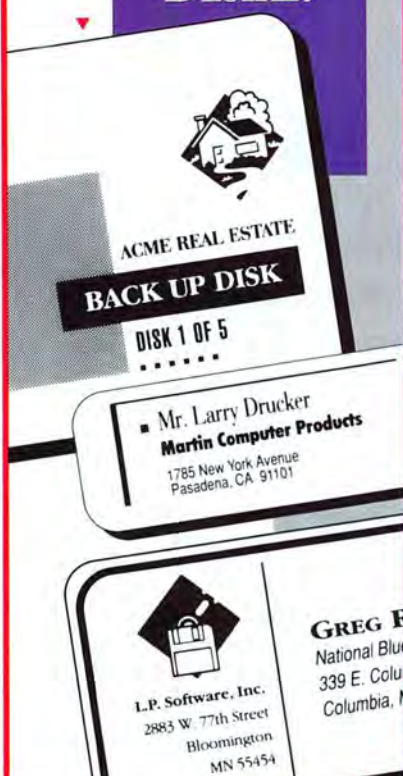
start scanning. Recognized text flows into your open document at the insertion point. The OCR software has controls for scan direction (down, right, left, auto), brightness, and column selection as well as controls for processing spreadsheet formats and documents printed on dot-matrix printers. If you have only an occasional need for OCR, the Typist will be a welcome tool, but its poky performance and higher error rate relative to software-only OCR packages such as OmniPage Pro make it impractical for processing medium to heavy loads. Compared with the other hand-held scanners we tested, however, the Typist boasted the best OCR performance.

The Typist's Graphic Editor, identical to that of Caere's industrial-strength OCR package, OmniPage Pro, lets you scan printed graphics; manipulate them with image-processing tools; and save them to disk as line art or as gray-scale TIFF, PICT 1 or 2, MacPaint, or EPS files. The Typist Plus Graphics doesn't support 256



Clockwise from upper left: Logitech's ScanMan Model 32, Thunderware's LightningScan Pro 256, and Caere's Typist Plus Graphics. Of the three, the Typist Plus Graphics most successfully combines OCR and image processing into one easy-to-use package.

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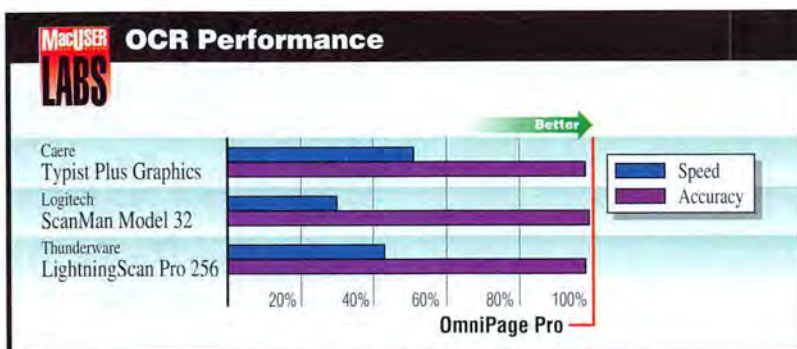
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NEW ON THE MENU REVIEWS



We compared the recognition speed and accuracy of Typist Plus Graphics, ScanMan Model 32, and LightningScan Pro 256 for a 750-word document with that of OmniPage Pro used with a flatbed scanner (our test platform was a Mac IIcx with 8 megabytes of RAM). Hand-held scanners are a good choice if you need to capture both photos and text, but they're best used only for light-duty OCR.

levels of gray — it's strictly a 1-bit device. Gray scale is interpolated through software. The only drawback to scanning graphics with the Typist is its inability to stitch multiple-pass images together — scanned artwork must be smaller than the 5.25-inch scan head (it can stitch text, however).

The Typist's SCSI implementation has been changed somewhat from the first version — instead of having to be positioned as the last device in the SCSI chain, it must now be positioned as the first item in the chain (after the Mac itself, of course).

The Typist requires a Mac SE or later, 4 megabytes of RAM, MultiFinder or System 7, and a hard drive.

ScanMan Model 32

Unlike the Typist, the ScanMan Model 32 began life as a hand-held gray-scale graphics scanner. Only recently did its maker, Logitech, transform it into a double-duty OCR/image-processing tool by bundling it with the company's OCR program, CatchWord Pro.

The main differences between the ScanMan/CatchWord Pro bundle and the Typist are software-related and are most apparent for OCR. The ScanMan lacks the Typist's convenience factor of interactive scanning from within other applications. You must export scanned text to a separate document (the ScanMan supports a variety of formats) and then import, open, or place it in an application. The software imposes a crippling 32K limit (two to three pages) on each OCR scan. CatchWord Pro does support text stitching (as does the Typist), so if you need to make more than one pass over a

page, the software can fit the results together properly. CatchWord Pro can scan text in English, French, or German too.

The ScanMan's graphics-scanning software also falls short when compared with the Typist's. The program provides basic retouching tools (you can erase; crop; paint; draw; and perform limited transformations such as rotate, invert, or flip) as well as controls for adjusting brightness and contrast. But the ScanMan's image-processing tools are not nearly as robust as the Typist's Graphic Editor, which provides an anti-aliasing brush and a variety of special effects. Moreover, the ScanMan supports only 32 levels of gray. Fortunately, given its relatively narrow scan head (4.5 inches), the ScanMan software supports image stitching, so you can make several passes to scan images larger than the scan head. You can use the ScanMan's graphics-scanning software in DA or application form, but the DA lacks support for the compressed-TIFF format.

To install the ScanMan, you connect it to your SCSI chain with a SCSI-adaptor box. Because the device is internally terminated, you must place it at the beginning or end of the chain, unless you're willing to crack open the adaptor box (instructions provided) and remove the termination. The package requires a Mac Plus or later, at least 2 megabytes of RAM (4 megabytes if you're running System 7), and a hard drive with 4 megabytes or more of free space.

LightningScan Pro 256

Like Logitech's ScanMan, Thunderware's LightningScan Pro 256 began life as an image scanner. Only recently has it

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been positioned as a dual-purpose product that includes Olduvai's ReadIt Pro OCR software.

Despite the relative OCR competence of ReadIt Pro (see review, March '92, page 50), we experienced more problems with the LightningScan Pro/ReadIt Pro OCR package than with either of the other hand-held-scanner packages we tested. We suffered several system crashes under System 7, even though no extensions were present and Thunderware claims that its product is System 7-compatible.

Overall, we found the LightningScan Pro far fussier for OCR than the other two products — the scanner head must be positioned just so on a page, and the drag speed must be just right for the scan to be acceptable. Under System 7, ReadIt Pro's Send Text To command lets you scan text directly into a document open in another application, such as a word processor, but in our tests this feature worked erratically at best.

Where the LightningScan Pro package really shines is in image processing. The package comes with two image-processing programs: Thunderware's own ThunderWorks and MicroFrontier's outstanding Enhance.

Compared to Caere's Graphic Editor, ThunderWorks sports a more conventional Mac interface, and it can scan and edit 1- and 8-bit images. The program comes with various controls for brightness and contrast as well as with filters for manipulating images and creating halftones. The software is capable of stitching images together, so you can scan images that are larger than the scanner's 4.5-inch head. Editing tools are included, and you can work at the fat-bits level. ThunderWorks can save files in the compressed/uncompressed-TIFF, MacPaint, EPS, PICT, and ThunderScan formats.

Enhance offers even more in the way of sophisticated image-editing features than does ThunderWorks, including masking, customizable transformation filters and editing tools, anti-aliasing, and a magic-wand selection tool.

The LightningScan Pro 256 connects to your Mac through a SCSI-converter box, and you can easily insert the converter at any point in the SCSI chain (unlike with the other two scanners). You need at least 2 megabytes of RAM (4 or more recommended), a hard drive, and System 6.0.7 or later.

The Bottom Line

The original Typist's marriage of hand-held scanning hardware to OCR software generated a lot of fanfare, but not until Caere made the product more versatile with the Graphic Editor could we place the Typist on our recommended list. If you're looking for an inexpensive scanning product that lets you capture photos as well as an occasional page or column of text, the Typist Plus Graphics is worth considering, given its ability to scan text directly into documents and its capable image-processing tools, wider scan head, and speed advantage relative to the ScanMan and the LightningScan Pro. For image scanning, the device's quasi-gray-scale approach won't meet the needs of professionals, but it's quite suitable for casual use.

The award for graphics handling goes hands down to Thunderware's LightningScan Pro 256, the only package in the group that offers true 256-level gray-scale scans, with powerful image-processing tools to boot. However, we found the LightningScan Pro's OCR technique too error-prone for us to recommend the device as a combined OCR/graphics solution.

— Gregory Wasson

Get Info

LightningScan Pro 256

Manufactured by: Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563; 510-254-6581.

Version: 1.3.2.

List Price: \$649.

ScanMan Model 32

Manufactured by: Logitech, Inc., 6505 Kaiser Drive, Fremont, CA 94555; 415-795-8500.

Version: 2.1.

List Price: \$599 (bundled with CatchWord Pro).

Typist Plus Graphics

***1/2

Manufactured by: Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; 408-395-7000.

Version: 2.0.

List Price: \$695.

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NEW ON THE MENU REVIEWS

MUSIC & SOUND

SoundEdit Pro and AudioTrax

Mac audio enthusiasts gain a wide range of new tools with SoundEdit Pro and AudioTrax.

Both the latest version of Macromedia's popular SoundEdit program, SoundEdit Pro, and Passport Design's AudioTrax are good examples of the trend toward ever-more-sophisticated tools for recording and editing sound with the Mac. SoundEdit Pro will have special appeal to those who own Macs with built-in sound-recording capability, and AudioTrax is a good entry-level tool for novice MIDI users.

SoundEdit Pro

To the previous version's support for the MacRecorder, SoundEdit Pro adds support for the built-in sound-recording capabilities of the newest Mac models (the Classic II, LC, LC II, IIsi, Quadras, and the PowerBook 140 and 170). For those who already own SoundEdit, SoundEdit Pro offers several attractive enhancements.

In addition to expanded sound-input support, SoundEdit Pro features a virtual-memory scheme that eliminates RAM constraints, which means that the maximum recording time is limited only by available disk space. And professional-level users who own Digidesign's Audiomedia or Sound Tools system will be enticed by SoundEdit Pro's ability to work with 16-bit sound files.

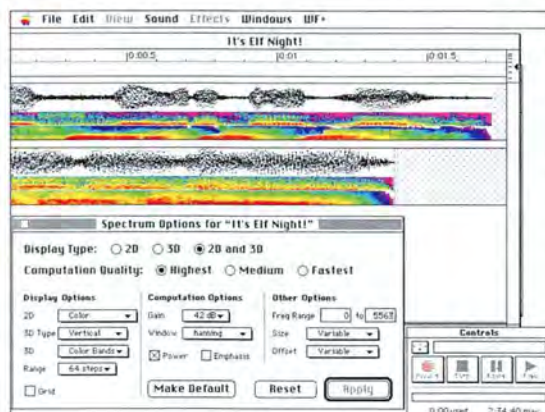
Background processing is another valuable addition to Macromedia's program. With SoundEdit Pro, you can elect to filter a large disk-based sound or

change its sampling rate and then switch to another application while SoundEdit Pro continues file processing as a background task. In our tests, however, this feature worked reliably only under System 7.

SoundEdit users will notice that the program's mixing feature is changed in SoundEdit Pro. The good news stemming from this change is that the sound-mix quality is clearly superior to that of SoundEdit. The bad news is that the mixing interface is more awkward and less capable than that of the previous version. For example, if you want to mix two sound channels, the channels must reside in the same document and you can't preview a mix or easily set volume changes for each track during the mix.

Macromedia has also made some improvements to the program's standard special-effects filters and added several new ones. SoundEdit Pro's new Noise Gate filter handily reduces low-volume artifacts and noise between sounds. A new Emphasize filter increases high-frequency response by putting the sound through a high-pass filter, a process that's similar to boosting the treble control on a stereo system.

Numerous small improvements on its predecessor further enhance SoundEdit Pro. You can preview a sound in the Open dialog box without opening its file—a truly useful addition. If you're looking for a way to do audio analysis or



The new Pro version broadens SoundEdit's appeal with support for sound-capable Macs. Sophisticated users can take advantage of advanced audio-analysis features such as the simultaneous display of spectral and standard waveforms, shown here.



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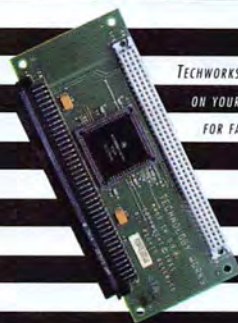


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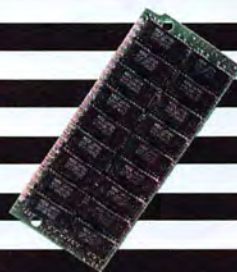
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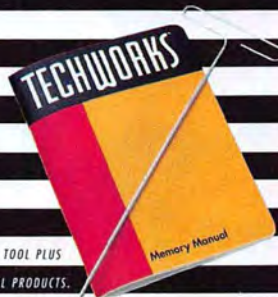
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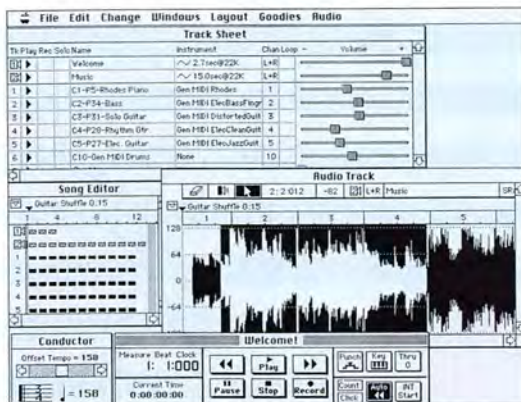
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NEW ON THE MENU REVIEWS



AudioTrax offers an inexpensive way to synchronize sampled sound with MIDI sequences.

tweak sounds to a fine degree, you can view the spectral- and standard-waveform displays simultaneously. SoundEdit Pro provides a fairly extensive set of controls and options for adjusting the spectral-display modes, and you can export spectral-display data into a spreadsheet program to do sound research. When you open sound resources, a new interface lists the resources, allows you to preview them, and displays all relevant resource-file data without requiring ResEdit. And finally, a long-overdue addition lets you set cue points, or markers, that enable you to jump instantly to a specific section of a sound file.

Our tests uncovered several annoying bugs. After using the Pause button, when we tried to continue playing the paused sound, the playback was erratic (the sound skipped and was distorted). Also, the playback indicator tended to skip and disappear, which limited its overall usefulness.

Although the \$295 list price of SoundEdit Pro seems a bit high, the \$75 upgrade cost is well worth it for current SoundEdit owners. All in all, SoundEdit Pro is a solid upgrade to a leading sound-editing program.

AudioTrax

AudioTrax is uniquely designed to blend MIDI sequences with as many as two channels of 8-bit 22-kilohertz (or lower) sampled sound. The program is essentially a scaled-down version of the Sound Tools/Studio Vision (Digidesign/Opcode) combination, which provides similar functionality for 16-bit CD-quality sound. At \$299, AudioTrax is the least expensive program for mixing MIDI music with sampled sound effects, but its limitations may frustrate professional MIDI musicians.

AudioTrax provides a set of controls that work with both the MacRecorder and the audio-input abilities of sound-capable Macs, so you can digitize sound directly from within AudioTrax. However, the program's sample-editing tools are rather limited.

In addition to support for the standard Cut, Copy, and Paste commands, the program provides three filters — one for normalizing (raising the recorded-sound volume to its highest possible point without introducing distortion), one for adjusting the gain (volume) of a recorded sound, and one for applying a noise gate (adjusting volume within a specific range). Unfortunately, AudioTrax doesn't support any of the echo/flanging/equalization options of SoundEdit Pro.

AudioTrax's MIDI sequencing portion, which is based on Passport's Trax sequencing program, contains a useful set of sequencing controls for beginning-to-intermediate MIDI musicians. You can create as many as 64 tracks (with 16 playing at any given time) either by recording in real time into the sequencer as you play music on a MIDI instrument or by entering notes one by one in step-record mode.

The software provides controls for accessing and editing the recorded MIDI data as discrete MIDI events, tracks, and measures. Event editing is presented in a highly graphical fashion and includes the ability to automatically smooth, or quantize, notes that fall outside the beat. Professional MIDI users, however, will find the sequencer portion of AudioTrax weak compared with Passport's Master Tracks PRO, Opcode's Vision, and Mark of the Unicorn's Performer sequencers.

The documentation that comes with

AudioTrax is excellent and includes a tutorial, a reference guide, and a slim volume on using AudioTrax in conjunction with other applications such as HyperCard and Macromedia's Director.

The Bottom Line

With their support for the audio-input capabilities of the new Macs, SoundEdit Pro and AudioTrax bring a range of powerful sound-management features within reach of a broad audience. SoundEdit Pro's numerous enhancements to its predecessor make it a must-have for current users of SoundEdit and an attractive option for owners of sound-capable Macintoshes who want to fully exploit the audio capabilities of their machine.

AudioTrax seems to be targeting multimedia producers who want to synchronize low-quality sampled sound with reasonably sophisticated MIDI music. However, the limitations of 8-bit 22-kilohertz audio make it undesirable for singing tracks and barely acceptable for spoken voice-overs. In addition, when the sampled sound is mixed with the relatively high quality of MIDI instruments, it's likely to stand out like a sore thumb. But AudioTrax's low price will give novice MIDI users an inexpensive way to experiment with syncing sampled sound with MIDI, so if that's what you're looking to do, this program may be the way to go.

— David Biedny

Get Info

AudioTrax

Published by: Passport Designs, 100 Stone Pine Road, Half Moon Bay, CA 94019; 415-726-0280.

Version: 1.01.

List Price: \$299.

SoundEdit Pro

Published by: Macromedia, 600 Townsend, San Francisco, CA 94103; 415-442-0200.

Version: 1.0.

List Price: \$295 (\$349 with a MacRecorder); upgrade for registered SoundEdit owners, \$75.

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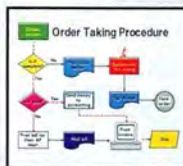
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NEW ON THE MENU REVIEWS

PROGRAMMING

Frontier

UserLand's scripting tool lets you write your own utilities for automating your desktop.

Although DOS users have been automating their desktops with batch files for years, only recently have Mac users gained the same level of control. With the release of Frontier, the first system-level scripting tool for the Mac, you can write your own utilities to enhance the Finder. Moreover, if you have programming experience, whether in HyperTalk or some other language, you can write even-more-powerful scripts that link the functions of IAC-aware applications.

The User's View

As miniprograms, scripts differ from commercial applications in two ways. They're shorter (from one line to a hundred lines and more), making them well suited for simple utility functions such as finding locked files. They also differ from commercial applications in production time — typically, scripts can be written, tested, and put into use in minutes, in contrast to the months required for commercial applications.

Frontier comes with a collection of ready-made utility scripts, so you can begin using the program as soon as you install it (you don't even have to read the documentation to use the scripts). Among those included in the package are scripts for counting the files in a folder, finding all locked files, backing up selected files,

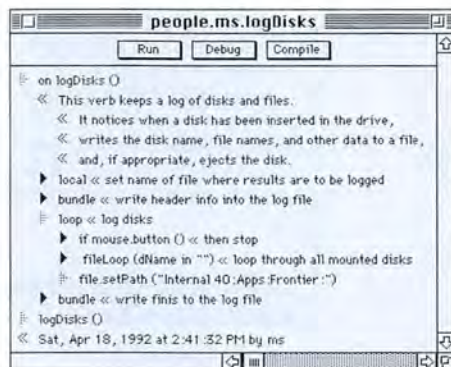
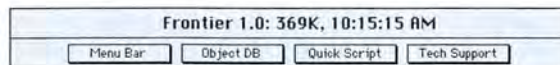
and displaying a graph of the free space on all mounted disks. On-line services such as CompuServe offer a growing number of scripts created with Frontier.

To use these Finder-related "desktop scripts," you simply double-click on their icons, just as you would with a stand-alone application. Unlike stand-alone applications, however, the scripts require Frontier to be present. If Frontier is not running when you click on a script, you'll experience a delay as Frontier launches. As a result, if you use scripts regularly and can afford the memory (Frontier requires 1 megabyte of RAM and System 7), it's best to keep Frontier open and running at all times. If you hold down the Command key while double-clicking on a desktop-script icon, you'll bring up the actual script in Frontier's script editor, where you can examine or modify it.

Of course, the real benefit of UserLand's Frontier is that it lets you write your own scripts, a process that can be as easy as typing a single command or as challenging as any assignment in intermediate programming.

The Scriptor's View

Desktop scripts are only one of the script types you can create with Frontier. You can also create one-line scripts,



Frontier enables you to create simple scripts (bottom) that automate Finder-related tasks. At the top is Frontier's main window, with buttons representing the four major components of the program.

which perform system functions or simple calculations, or multiline scripts, which perform more-complex tasks. Multiline scripts are composed in Frontier's script editor and can either be saved as desktop scripts or stored in Frontier's internal database, where you can invoke them by typing their name in the program's Quick Script window. Keep in mind that multiline-script writing is real programming and Frontier provides a real programming environment.

The key to unlocking Frontier's power lies in mastering its programming language, UserTalk. UserTalk is a serious programming language derived from C, so don't expect it to be as simple to learn and use as HyperTalk. The language consists of a few basic structuring elements, standard operators, and some 350 verbs. You can extend the language by creating new verbs.

Several novel features in UserTalk make it easier to use and learn than most other programming languages. One such feature is outlining. Other languages use semicolons and special terms to indicate the structure of a program; UserTalk employs a simple outline structure.

Compiling and Debugging

Frontier compiles UserTalk scripts and retains the source code. Compilation of scripts consisting of 100 lines or less is fast. A debugger provides single-stepping and breakpoints. Hypertextual links let you Command-click on a verb to see its on-line documentation, created with a separate application called DocServer; updating the on-line documentation is simply a matter of updating the text file. DocServer ensures that your verbs will be documented consistently with UserLand's style, which is an important feature for those who want to distribute their scripts.

Another novel feature is Frontier's object database. The program stores all data types, including scripts, in a hierarchical internal database through which you can easily browse. The object database automatically invokes the appropriate editors as you browse through items — the outline editor is invoked for the outline, for example, and the script editor for scripts. Variables used by scripts are also stored in the object database, so scripts can share data without requiring that script writers fuss with various file formats.

One especially powerful UserTalk

feature is the ability to work with all forms of IAC (Apple events, Apple's Object Model, Microsoft's DDE, and UserLand's IAC Toolkit), so Frontier scripts can drive any application that can respond to IAC events. Typically, this requires some form of "glue code." (Glue code already exists in several applications, notably Aldus PageMaker 4.2.)

Frontier also lets you set scripts to run in the background, where they can display the time, monitor real-time processes such as E-mail, and perform background tasks such as backup. When several scripts perform related functions, you can group them into a "suite," provide them with their own menu (menus can be edited), and install or distribute them as a unit.

Ambitious script writers should be able to do impressive things with Frontier, using it to tie functions of various applications together in scripts. Frontier is not intended to serve as an application-development language, however, and you shouldn't expect scripts to perform at the same level as commercial applications do. Simple scripts won't seem particularly slow, but those that visit a lot of folders and files can take a long time to execute. Finally, Frontier scripting is for neither novices nor the unwary. Its access to the system makes it a potentially dangerous tool (it's possible, for example, to erase a hard disk with Frontier).

The Bottom Line

UserLand's Frontier is a smoothly executed and powerful tool for developing utilities that drive both the system and IAC-aware applications under System 7. Although not everyone will want to tackle the complexities of scripting with Frontier, those who do will find that it gives them unprecedented control over the Mac and its applications.

— Michael Swaine

Get Info

Frontier

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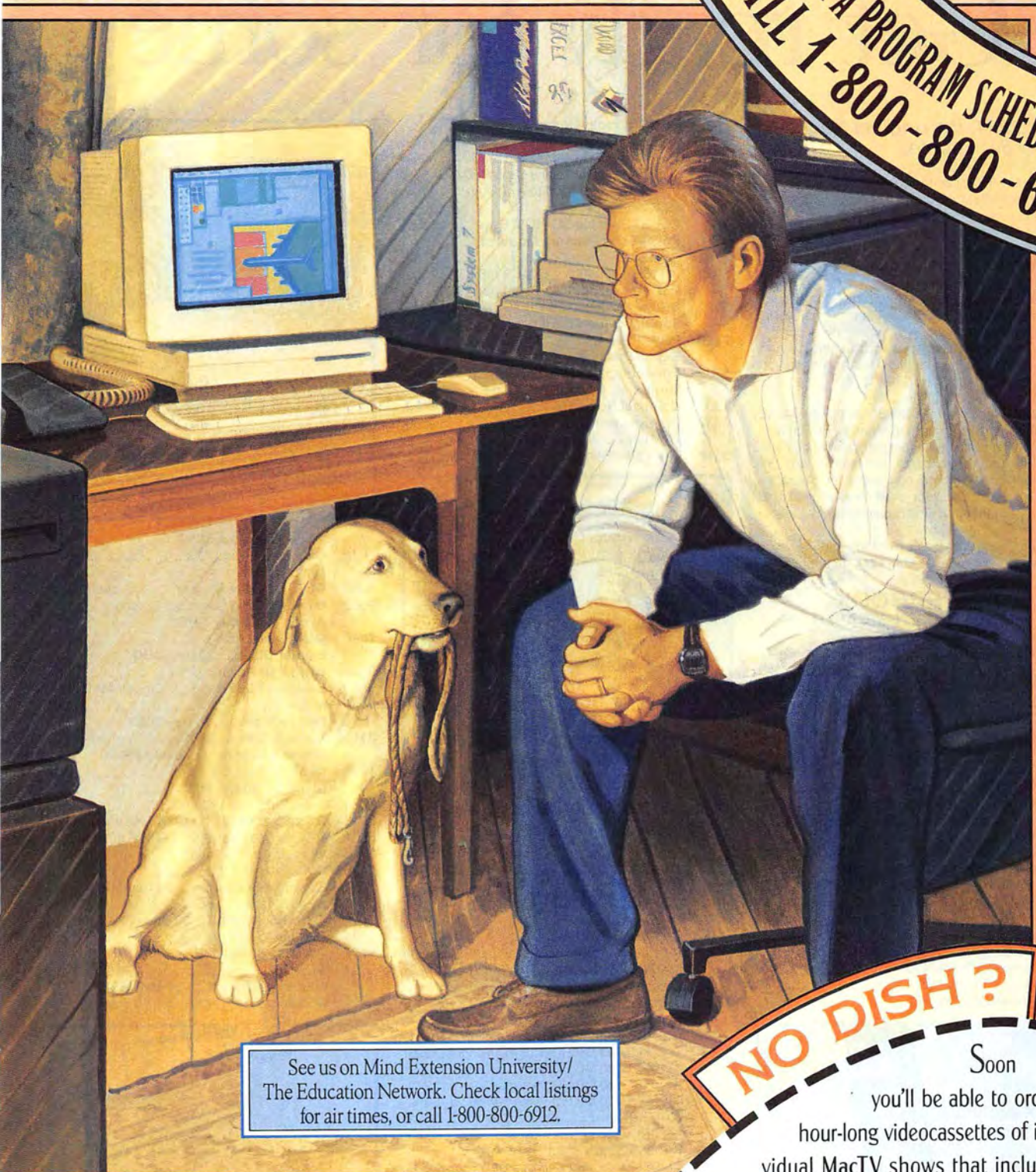
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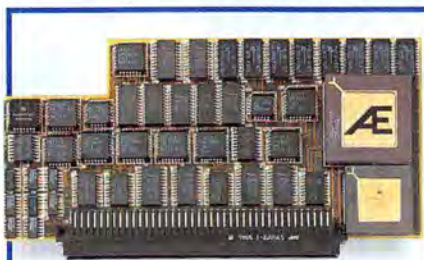


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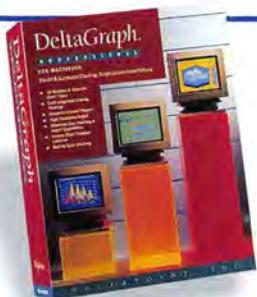
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6925	Now Utilities 3.02.....	83.
	★ON Technology ... 1 year MBG	
6385	On Location 2.0.....	75.
	Palomar Software	
8210	PLOTTERgeist 2.0.....	249.
	Peripheral Land, Inc. (PLI)	
7326	Mac-to-DOS.....	99.
	★Salient Software ... 30 day MBG	
7404	DiskDoubler 3.7.5.....	45.
4838	AutoDoubler.. 45. 6092 (10 pak).....	295.
	★Symantec ... 30 day MBG	
5176	Symantec AntiVirus for Mac (SAM).....	64.
5724	Symantec Utilities for Mac (SUM II).....	96.
6748	Norton Utilities for Mac 2.0.....	95.
3421	THINK Pascal 165. 2688 THINK C.....	199.
9957	THINK Reference 1.0.....	68.
	Teknosys	
5203	HELP!.....	89.
	★TGS Systems ... 60 day MBG	
6667	Prograph 2.5.....	309.
	★Thought I Could ... 30 day MBG	
4843	Wallpaper 1.0.2.....	37.
	UserLand Software	
4753	Frontier.....	189.
	★Visionary Software ... 30 day MBG	
3887	First Things First 2.1.....	41.

Macintosh. Every day.



After Hours Software

1352 **TouchBASE 2.0.1**—Keeps track of personal & business contacts..... \$79.
3314 **DateBook 1.0**—Combines calendar, scheduling, alarms, & To-Do lists to help you keep on top of your important events..... 79.

LEARN & PLAY

FOREIGN LANGUAGES, TRAINING, GAMES

- *Abracadata, Ltd. ... 30 day MBG
- 5805 **Sprout! 1.0** (veggie garden planner).... 47.
- *Baseline Publishing ... 30 day MBG
- 7785 **Talking Moose 4.0.2**..... 22.
- Broderbund Software
- 6516 **The Playroom 2.0 (CP) (color)**..... 29.
- Carmen Sandiego Series (CP)**..... ea. 29.
- 3559 **SimAnt**..... 35.
- 8266 **SimEarth 1.1**..... 40.
- 4966 **SimCity (CP)** .. 29. 5871 **Supreme**... 47.
- *Centron Software ... 30 day MBG
- 2707 **Puzzle Master**..... 26.
- 8525 **Casino Master**... 39. 8524 (Color).... 45.
- *Cyan ... 30 day MBG
- 6320 **Manhole 1.6**..... 19.
- *Davidson & Associates ... 30 day MBG
- 3922 **Talking Spell II Plus**..... 29.
- 7024 **Headline Harry & the Great Paper Race** 34.



*Abracadta, Ltd. ... 30 day MBG

5805 **Sprout 1.0**—The complete computer planning tool for vegetable gardeners produces a graphic, scalable garden plan with correct plant and row spacing. Prints garden layouts, calendars, shopping lists, and reports..... \$47.

- 2574 **New MathBlaster Plus**..... \$34.
- 8278 **Alge-Blaster Plus**..... 34.
- EARTHQUEST**
- 8050 **EARTHQUEST** or 3118 **Ecology 1.0** 34.
- Electronic Arts**
- 5702 **4D Boxing**.... 32. 1907 **PGA Golf**.. 39.
- ***Expert Software** ... 30 day MBG
- 6219 **Expert Astronomer 1.0**..... 29.
- Graphic Simulations**
- 4756 **Hellicats Over the Pacific 1.0**..... 39.
- ***Great Wave** ... 30 day MBG
- 6693 **KidsMath 2.0 (Color)**..... 25.
- 4334 **NumberMaze** .. 25. 8527 **(Color)**.. 35.
- ***HyperGlot Software** ... 30 day MBG
- Word Torture** ea. 34. **Tense Tutor** ea. 38.
- (French, German, Italian & Spanish)
- Pronunciation Tutor**
- (Span., Fren.) ea. 34. (Germ., Chin.) ea. 38.
- ***Inline Design** ... 30 day MBG
- 1562 **3 in Three or 1944** **Swamp Gas**.. ea. 31.
- 8809 **Tesseract 31**. 3414 **Mutant Beach** 43.
- Interplay Productions**
- 1894 **BattleChess (3D animation)**..... 29.
- 1893 **CheckMate (infinite play levels)**..... 31.
- ***Learning Company** ... 30 day MBG
- 2670 **Reader Rabbit 3.0 (CP) (ages 4-7)**.... 34.
- 3687 **Super Solvers: Midnight Rescue!**..... 34.
- 3281 **The Writing Center 1.0**..... 51.
- ***Leister Productions** ... 30 day MBG
- 7126 **Reunion 3.0**..... 115.
- ***MECC** ... 30 day MBG
- 3963 **Oregon Trail 1.0**..... 28.
- Number, Word, or Super Munchers** ea. 28.
- ***Microsoft** ... 30 day MBG
- 2868 **Flight Simulator 4.0 (CP)**..... 42.
- ***Multimedia Library** ... 30 day MBG
- 7312 **Educ. Series V. 1-Animated Relativity** 105.
- ***Nordic Software** ... 30 day MBG
- 8258 **Turbo Math Facts 2.0**..... 24.
- 8257 **PreSchool Pack - Color 1.0**..... 34.
- ***Penton Overseas** ... 30 day MBG
- VocabuLearn/ce Levels I & II (Span., Fren., Germ., Ital., Rus., Japan., & Heb.)**... ea. 35.
- VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.)**..... ea. 35.
- ***Personal Training Sys.** ... 60 day MBG
- Over 60 learning levels from beg. to adv. for System 7, QuarkXPress, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, Excel, ClarisWorks & the Mac.....ea. 59.
- Sierra On-Line**
- 3545 **EcoQuest (July '92)**..... 35.
- 3552 **Leisure Suit Larry V**..... 39.
- 7396 **Red Baron**..... 39.
- ***SoftStream** ... 30 day MBG
- 4489 **Galactic Frontiers**..... 38.
- Software Toolworks**
- 4619 **Mavis Beacon Typing 1.3 (CP)**..... 32.
- ***Spectrum Holobyte** ... 30 day MBG
- 3464 **Tetris 1.3**.. 22. 3017 **Wordtris 1.0**.. 27.
- 3459 **Falcon 2.2.1** or 8181 **Vette 1.0**... ea. 33.
- ***Strategic Studies** ... 30 day MBG
- 3287 **Warlords (empires at war)**..... 34.
- StudyWare**
- ACT, GMAT, GRE or SAT Prep** ... ea. 29.
- Terrace Software**
- 9970 **Mum's The Word Plus 1.01 (color)**... 107.
- ***Toyogo** ... 30 day MBG
- 7624 **NEMSIS Go Master 5.0**..... 39.
- 7623 **NEMSIS Go Master Deluxe 5.0**..... 99.



*ALSoft ... 30 day MBG

9807 **DiskExpress II 2.11**—The world's safest, most powerful disk optimizer that gives you all the speed you need. Only DiskExpress II intelligently monitors daily activity for personalized hard disk optimization..... \$49.

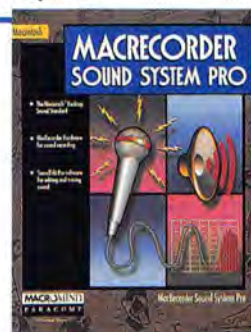
*Voyager ... 30 day MBG

- 2809 **The Annotated Alice**, 2836 **Hitch Hiker's Guide to Galaxy**, 2820 **Jurassic Park** ea. 15.

VIDEO AND SOUND MONITORS, MUSIC, ANIMATION

*Ars Nova ... 30 day MBG

- 1215 **Practica Musica 2.3**..... 66.
- Articulate Systems**
- 7013 **Voice Navigator SW w/Headset Mike**.. 325.
- 7014 **Voice Navigator SW w/Desktop Mike**.. 325.
- Coda Music Systems**
- 8188 **MusicProse**... 189. 5604 **Finale**.. 549.
- ***Macromedia** ... 30 day MBG
- 5486 **Sound Edit PRO**..... 207.
- 4598 **MacRecorder Sound System PRO**... 239.
- 5087 **MacroMind Director 3.1**..... 799.
- 2246 **MacroMind Three-D 1.0**..... 999.
- NEC**
- 5021 **MultiSync 6FG**..... 2899.



*Macromedia ... 30 day MBG

4598 **MacRecorder Sound System PRO**—Incl. MacRecorder and Sound Edit PRO. Complete sound capture and editing system. Record and edit voice, music and special effects..... \$239.
5486 **Sound Edit PRO**..... 207.

MacTV: Coming soon



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 5737 ⑦ *After Dark 2.0V*—1992 Macworld World Class Award for Utility-System Enhancement. Stops screen burn-in \$28.
 2198 ⑦ *More After Dark (M.A.D.)* 23.
 2196 ⑦ *After Dark & M.A.D. Bundle* 39.

★ **Nutmeg Systems ... 30 day MBG**
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 ⑦19" for GrayScale SE/30, II, IIsi ea. 1295.
 ⑦20" Color System: SE/30, II, IIsi ea. 2595.
PCTV
 2244 System 7 Video . 9. 2245 w/Lon's Book 25.
RasterOps
 9784 RasterOps 24SX .. 649. 8944 24STV 829.
Sigma Designs
 6944 Power Portrait (platinum) 769.
Software Toolworks
 5201 The Miracle (piano teacher) 349.
Sound Source
 3547 ⑦Star Trek: The Logical Collection 29.
 3607 ⑦Star Trek: The Final Frontier 29.
 4920 ⑦Star Trek: The Bundle (I gotta have both!) 49.
 ★ **SuperMac Technology ... 30 day MBG**
 4122 VideoSpigot LC or 4114 IIsi ... special 349.
 4164 VideoSpigot (for NuBus) 479.
 7676 VideoSpigot Pro. 1399. 3691 Pro si 1299.
 7679 Spigot & Sound (NuBus) 779.
 7678 Spigot & Sound Pro (NuBus) 1649.
 7677 17" SuperMatch Multimode 1149.
 7675 20"-T" SuperMatch Multimode Trinitron 2999.
 1805 20" SuperMatch Color Display 1799.
 5000 20" Dual-Mode Trinitron 2699.
 4720 21" Platinum Two-Display 1099.
 1877 Spectrum/8LC or 2026 S/8si ea. 536.
 1844 Spectrum/8 Series III 536. 1851/24 Series III 1525.
 2330 Spectrum/8•24 PDQ or 2231 PDQsi ea. 899.

CD-ROM

Broderbund
 3730 ⑦Just Grandma and Me (CD-ROM) 34.
CD Technology
 2321 CD-ROM Caddy ... 11. 2533 (5 Pack) 49.
 8057 Porta Drive CD-ROM 579.
 ★ **Cyan ... 30 day MBG**
 2717 ⑦Cosmic Osmo 1.1 (CD-ROM) 37.
 ★ **Ergonomic Software ... 30 day MBG**
 7056 ⑦Panoramix Vol. 1 (CD-ROM) 69.
 ★ **Highlighted Data ... 30 day MBG**
 7771 ⑦Webster's Dictionary (CD-ROM) 159.
 6968 ⑦Footage '91 (CD-ROM) 159.
 ★ **HyperGlot ... 30 day MBG**
 ⑦Berlitz Think & Talk (CD-ROM) (French, German, Italian, or Spanish) ea. 125.
 ★ **ICOM Simulations ... 30 day MBG**
 3717 ⑦Sherlock Holmes, Consulting Detective 39.
 ★ **METATEC/Discovery Sys. ... 60 day MBG**
 9967 ⑦Nautilus (subscription, CD-ROM) 20.
 6823 ⑦Best of MIDI Connection 32.
 3683 ⑦Backpac Set 1 or 3679 ⑦Set 2 ea. 45.

★ **Multimedia Library ... 30 day MBG**
 Image Series Vol. 1-4 (Russia/China, Tropics, Parades & Demos., or Ancient Egyptian) ea. \$105.
 7313 Sound Series V.1-Music for Multimedia 399.
NEC
 6577 ⑦CDR-37 CD-ROM Portable Drive 399.
 6826 ⑦General Reference CD-ROM Bundle 529.
 6582 ⑦CDR-74 CD-ROM Drive 589.
Software Toolworks
 3915 ⑦Grolier Encyclopedia (CD-ROM) 249.
 ★ **Voyager ... 30 day MBG**
 3917 ⑦A Silly, Noisy House CD 39.
 3918 ⑦Baseball's Greatest Hits CD 49.

COMMUNICATIONS MODEMS, MAIL, NETWORKS

Apple Computer
 7073 ⑦Macintosh PC Exchange 69.
 7101 ⑦AppleTalk Remote Access 165.
 7102 ⑦AppleShare 3.0 999.
 ★ **Applied Engineering ... 30 day MBG**
 8362 ⑦QuadraLink (with AE Shadow) 205.
 ★ **Argosy Software ... 30 day MBG**
 7872 ⑦Software Bridge/Mac 2.0.1 99.



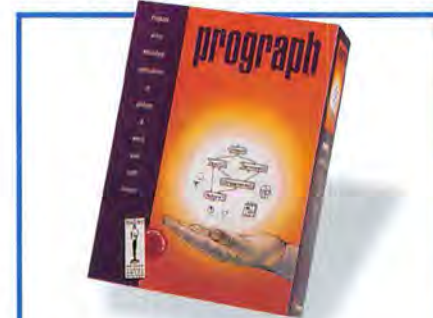
★ **Argosy Software ... 30 day MBG**
 7872 ⑦ *Software Bridge/Mac 2.0.1*—Automatic translation between all major Mac & DOS word processors. "It's the strongest in the field of reliable DOS-to-Mac conversions of complex documents." (MacWEEK, 11/6/90) \$99.

★ **CE Software ... 60 day MBG**
 8066 ⑦QuickMail (5 user) 249.
 8067 ⑦QuickMail (10 user) 375.
 ★ **CompuServe ... 60 day MBG**
 1676 ⑦Macintosh Membership Kit 1.6 25.
 1673 ⑦CompuServe Navigator 3.1 49.
 1674 ⑦Membership Kit/Navigator Bundle 72.
 ★ **DataViz ... 60 day MBG**
 4842 ⑦MacLink Plus/Translator 6.0 109.
 1823 ⑦MacLink Plus/PC 6.0 129.
 ★ **Dayna ... 60 day MBG**
 DaynaPORT TRX: (BNC or 10 BASE-T) ea. 87.
 DaynaPORT E: (10BASE-T) ea. 149.
 DaynaPORT E: SE, SE/30 II, IIsi, LC 149.
 8719 EtherPrint 345. 9888 (10BASE-T) ea. 339.
 7888 DaynaPORT E/11-3 Adapter 199.
 DaynaPORT SCSI/Link (BNC or 10 BASE-T) 269.
Dove Computer
 6758 ⑦DoveFax 2.0 .. 199. 3352 NuBus 229.
 9634 ⑦DoveFax Plus .. 265. 4111 NuBus 299.
 ★ **Farallon Computing ... 30 day MBG**
 Full line of EtherMac Cards available ... call
 9805 ⑦Timbuktu 4.0.2 or 4866 ⑦/Remote 3.0 129.
 6273 PhoneNET StarConnector 10-Pack 129.
 4869 PhoneNET Connector 10-Pk (DIN8) 198.
 9961 PhoneNET Card PC 209.
 2206 PhoneNET StarController 307 879.
 4802 Star 357... 1025. 4814 Star 377 ... 1299.



★ **Freesoft ... 30 day MBG**
 6115 ⑦ *White Knight 11*—11 award winning communications program that supports XMODEM, YMODEM, ZMODEM, Kermit, & CompuServe Error Correcting protocols. Includes Okyto 1.0. Geared to all levels of experience \$85.

★ **Freesoft ... 30 day MBG**
 6115 ⑦ *White Knight 11* 85.
 ★ **Global Village ... 30 day MBG**
 8946 ⑦TelePort A300 2.1 129.
 8945 ⑦TelePort/FAX 2.1 169.
 5327 ⑦TelePort/Full FAX 2.1 219.
Hayes
 5101 ⑦HayesConnect 3.0 (modem sharing) .. 75.
 2300 ⑦Smartcom II for the Mac 3.3B 84.
 1345 OPTIMA 24 Modem 155.
 3522 OPTIMA 96 Modem 389.
Insignia Solutions
 7557 ⑦Access PC 2.0 60.
 9726 ⑦Entry Level SoftPC 2.5 125.
 4089 ⑦Universal SoftPC 2.5 195.
 3229 ⑦SoftAT 2.5 299.
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Logiccode Technology
 5525 Quicktel Xeba M9624XV 169.
 5524 Quicktel Xeba M9696XV 369.
 5523 Quicktel Xeba M1414XV 429.
 ★ **Lotus Development ... 30 day MBG**
 7121 ⑦cc:Mail Macintosh Platform Pack 2.0 339.
MASS Microsystems
 3655 MASS fm 24/96 (portable modem) 185.
 ★ **Microcom ... 30 day MBG**
 7459 ⑦CarbonCopy Mac 2.0.1 (single) 59.
 ★ **Microsoft ... 30 day MBG**
 9444 ⑦Microsoft Mail 3.0 (1-5 user) 269.



★ **TGS Systems ... 60 day MBG**
 6667 ⑦ *Prograph 2.5*—This visual, OOP environment is the right tool for creating Mac apps faster. It's a great way to learn OOP, build a prototype or produce that application you've been dreaming about \$309.

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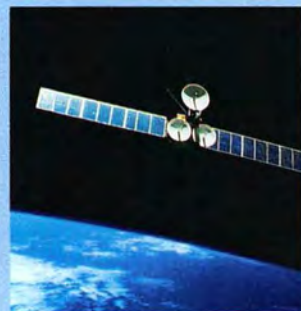
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- 4871 ⑦ Checklist 2.02—1991 MacUser Editors' Choice Award for Best Prepress Product \$62.
1506 ⑦ Datashaper 62.
1507 Barcode Kit 62.

MASS Microsystems

- 2605 DataPak 45 579. 2599 DataPak 88.... 849.
Diamond Drives:

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2969 320 MB HD 1499. 2952 510 MB HD 2119.
5898 1" 80 MB Port...449. 5899 120 MB.. 559.
3678 120 MB Port. 569. 3663 210 MB Port. 979.
3662 320 MB Port. 1549. 3659 510 MB Port. 1999.
3657 HitchHiker Portable Drive (40 MB)..... 479.
3656 HH (80 MB) 749. 7008 HH (120 MB) 899.

★MDS Drives ... 60 day MBG

- 5533 MDS 44 SyQuest w/AutoDoubler 1.0.6 499.
5532 MDS 44 SyQuest w/Norton Utilities 2.0 499.
5534 MDS 88 SyQuest w/AutoDoubler 1.0.6 599.
5535 MDS 88 SyQuest w/Norton Utilities 2.0 599.
5529 44 MB Cart.(3 pak) 199. 5528 (5 pak) 329.
5531 88 MB Cart.(3 pak) 312. 5530 (5 pak) 512.

★Micron ... 30 day MBG

- 7149 Xceed Ilici-128K Cache Card..... 239.
2262 Xceed Color 30 Card (SE/30)..... 279.
2260 Xceed Gray-Scale 30 Adapter Card..... 75.
3668 Xceed Macro Color 30 24-bit Video Card 489.

Peripheral Land, Inc. (PLI)

- 6432 3 1/2" Optical Media..... 65.
1866 Quick SCSI Card (requires cable)..... 319.
8335 PLI TurboFloppy 1.4..... 295.
8327 PLI Infinity 40 Turbo (removable)..... 599.
9752 PLI Infinity 88 Turbo (removable)..... 729.
4645 PLI Infinity MO 3.5" Optical Drive 1699.

★Lotus Development ... 30 day MBG

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3604 ⑦ 1-2-3 Competitive Upgrade 89.

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2865 Floptical Cart. (21 MB) 35. 2899 (10 pak) 299.
2644 PLI 52 MB External Hard Drive 449.
7123 85 MB..... 419. 7124 120 MB..... 539.
7125 330 MB... 1399. 7145 520 MB..... 1699.
7140 670 MB... 1999. 7122 1.26 GB..... 2699.
8330 PLI 105 MB (Quantum) 599.

MEDIA

★Fuji ... 60 day MBG

- 2214 3 1/2" DS Disks (10) 9. 2242 (50).... 32.
2215 3 1/2" HD Disks (10) ... 15. 2241 (50) ... 59.
4863 3 1/2" HD Disks (20) with storage case.... 26.
2243 3 1/2" Color (10) DS 10. 2239 (10) HD... 18.

★Sony ... 60 day MBG

- 3297 3 1/2" DS Disks (10) 9. 6148 (30)..... 25.
3298 3 1/2" HD Disks (10) .. 15. 6375 (30)..... 42.
1603 DG60M 16. 2520 DG90M..... 22.
8185 QD2040..... 14. 1895 QD2120..... 21.

★SyQuest ... 60 day MBG

- 5912 44 MB Cartridge (1).... 69. 5529 (3) . 199.
5528 44 MB Cartridge (5) .. 329. 9728 (10) 649.
3603 88 MB Cartridge (1) ... 107. 5531 (3) . 312.
5530 88 MB Cartridge (5) .. 512. 3600 (10) 999.

★3M ... 60 day MBG

- 3943 DC2000..... 17. 1581 DC2120 23.



★Dayna ... 60 day MBG

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- American Power**
3447 SurgeArrest Plus 39.
Apple Computer
9773 StyleWriter Ink Cartridge 22.
7748 Personal LaserWriter Toner Cartridge .. 87.
1115 LaserWriter II Toner Cartridge..... 105.

★Avery ... 60 day MBG

- 7050 Avery 5660 (1" x 2 1/2"-Clear Adrs.-Laser) 32.
5392 Avery 5196 (3 1/2"-Disk Labels-Laser)..... 29.

★Curtis Manufacturing ... 30 day MBG

- 8973 Apple Security Kit (SL-2)..... 22.

★I/O Design ... 30 day MBG

- 8812 Ultimate Classic Carrying Case..... 64.
1941 Ultimate LC Carrying Case..... 95.

★Kensington ... 30 day MBG

- Full line available. Partial listing.
4973 Power Tree 20 24.
2559 Apple Security Kit..... 33.
6763 Mac SE Anti-Glare Filter..... 52.
3623 Apple 12" Anti-Glare Filter..... 63.

★Moustrak ... 60 day MBG

- 2694 Moustrak Pad (7"x9") 8. 2692 (9"x11") . 9.
2693 Moustrak Pad Low Friction (9" x 11").... 10.



★SoftSync, Inc. ... 30 day MBG

- 7129 ⑦ Accountant, Inc. 3.0—1991 MacUser Editors' Choice Award for Best Accounting Package. "The most complete integrated accounting and financial mgmt. package," MacUser (3/91) \$335.
3828 ⑦ Accountant, Inc./MultiUser 1.0 569.

★Targus ... 60 day MBG

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4015 Mac SE & Ext. Kybd. Carrying Case 75.

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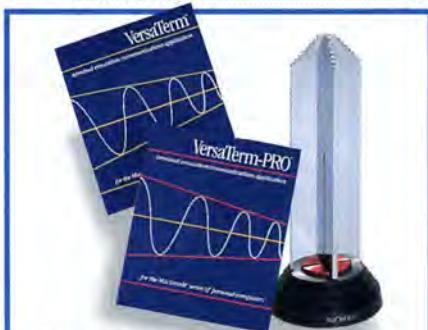
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- ★ **Practical Peripherals ... 30 day MBG**
- 8994 2400 V.42bis Modem \$125.
- 7934 PM9600SA Modem 1.26 289.
- 9849 SmartPack 9600 (with Smartcom II) .. 349.
- ★ **Prometheus ... 30 day MBG**
- 2590 ProModem 2400 Mini Plus 129.
- 4724 Home Office 259.
- 8990 Ultima Home Office 489.
- PSI Integration, Inc.**
- 3143 COMstation ONE 195. 3142 TWO .. 299.
- 5340 COMstation FOUR 369. 6965 FIVE 549.
- ★ **Shiva ... 30 day MBG**
- 3444 NetSerial 1.35 275.
- 4347 NetBridge or 4942 TeleBridge 399.
- 6555 LanRover/L 599.
- NetModem/E (thick, thin, 10BASE-T) ea. 1479.
- Sitka/TOPS**
- 4188 Teleconnector (DIN8) 23. 2230 (10) 189.
- 6264 TOPS Network 3.1 187. 2419 (3-Pak) 249.
- ★ **Software Ventures ... 30 day MBG**
- 3455 MicroPhone II 4.0 limited special 179.
- ★ **Synergy ... 30 day MBG**
- 6618 VersaTerm 4.6.. 90. 6619 PRO 3.6 177.
- ★ **Technology Concepts ... 30 day MBG**
- 6314 Fax Line Mgr. 202 119. 6315 Mgr. 203 139.
- ★ **TechWorks ... 30 day MBG**
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- 1763 Hubworks-8 249.
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- 8046 MVP Mouse (MVP-1) 89.
- ★ **Datadesk ... 30 day MBG**
- 9830 MAC101E 126. 2384 with QuicKeys 149.
- 6901 Switchboard (modular keyboard) 159.
- ★ **Everex ... 30 day MBG**
- 1144 Silhouette Trackball 1.0 (ADB Macs) .. 78.
- GDT Softworks**
- 3429 BetterWriters 1.01 (software drivers) .. 39.
- 2499 PowerPrint 94.
- Hewlett-Packard**
- 6514 HP B&W DeskWriter (w/cartridge) 479.
- 2964 HP Color DeskWriter C (w/color cart.)... 849.
- 9993 HP LaserJet IIIP (requires kit) 1099.
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NEW ON THE MENU

REVIEWS

FINANCIAL MANAGEMENT

Evolve

Evolve creates custom financial reports on accounting data, but its file setup is cumbersome.

Evolve is a financial-analysis tool that aims to provide something most accounting packages are missing — namely, the ability to produce a variety of custom financial statements, budgets, business ratios, and graphs. Unfortunately, getting data from an accounting package into Evolve is a daunting chore that will likely drive most users to seek alternative solutions.

Excel Macros

Evolve is actually a complex collection of Microsoft Excel 3.0 macros. To use the program, you must have Excel 3.0 installed on your hard disk. For some functions, such as creating graphs, Evolve uses Excel's tools.

Unfortunately, several weaknesses seriously detract from Evolve's overall usefulness as a reporting tool. Initial setup is clumsy and far from automatic. In addition, most calculation operations are quite slow compared with those in spreadsheet or accounting programs.

To create its budgets and statements, Evolve maintains a set of records separate from those in your accounting program. As a result, before you can import your financial data into Evolve, you must create an Evolve data set, which comprises a nested collection of files and folders that store company information, imported data, reports, charts, work files,

and layout templates. You can create as many data sets (for different companies, for example) as disk space allows.

Creating data sets is a chore in itself, but Evolve's cumbersome and nonstandard interface complicates the process. To begin with, the program uses a rigid naming and positioning scheme for the folders and files within data sets. Only the top-level folder in each set can have a unique name. The remaining files and folders within a set receive the same names (Balance Sheets and Trial Balances, for example) as their counterparts in other sets, which means that you must be careful not to open more than one set at a time. In addition, if the top-level folder for each set doesn't reside at the root level of the disk, Evolve can't locate it. Moreover, you can't double-click on a data set to open it; instead, you must use the Open Set command on Evolve's File menu.

To get data from your accounting program into an Evolve data set, you begin by exporting a trial balance in SYLK, CSV, WKS, WK1, WK3, DIF, DBF2, DBF3, DBF4, Excel, or ASCII format. Before Evolve can import it, however, the data must adhere to the following format: Column 1, G/L account number; Column 2, Account description; Column 3, First month's amounts; Columns 4 and up, Each subsequent month's

Chart of Accounts for Company - Target Enterprises, Inc.		Comparative Income Statement	
No.	Account Type	Feb-90	Feb-91
1	Cash In Bank		
2	Accounts Receivable		
3	Inventory		
4	Prepaid Expenses		
5	Fixed Assets		
6	Accumulated Depreciation		
7	Accounts Payable		
8	Notes Payable		
9	Long-Term Debt		
10	Equity		
11	Common Stock		
12	Retained Earnings		
13	Dividends		
14	Cost of Sales		
15	Gross Profit		
16	Selling Expenses		
17	Administrative Expenses		
18	Interest Expense		
19	Income Tax Expense		
20	Net Income		
21	Loss		
22	Other Income		
23	Other Expenses		
24	Net Loss		
25	Total Revenue	57,664.67	59,622.92

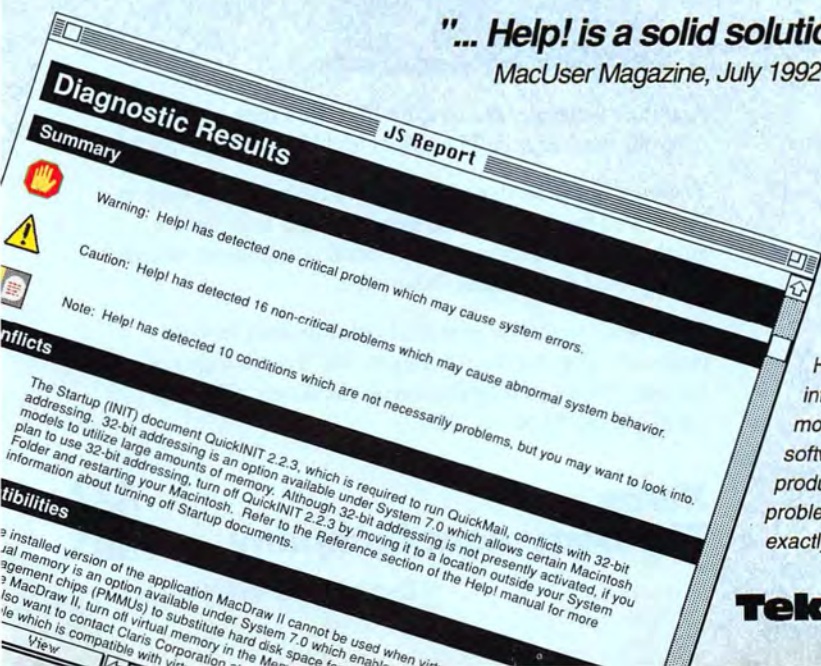
Evolve lets you create custom financial reports on your accounting data, but its setup procedures are clumsy and time-consuming. If the tools on the menu bar look familiar, that's because Evolve is actually a complex set of Excel 3.0 macros.

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CIRCLE 138 ON READER SERVICE CARD.

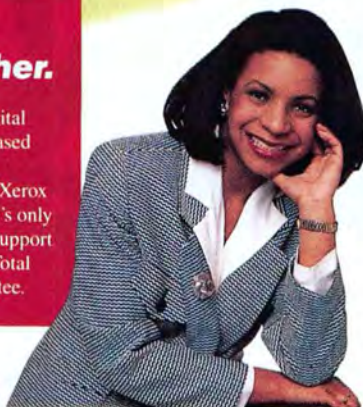
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Tammy M. Johnson
Xerox Account Representative



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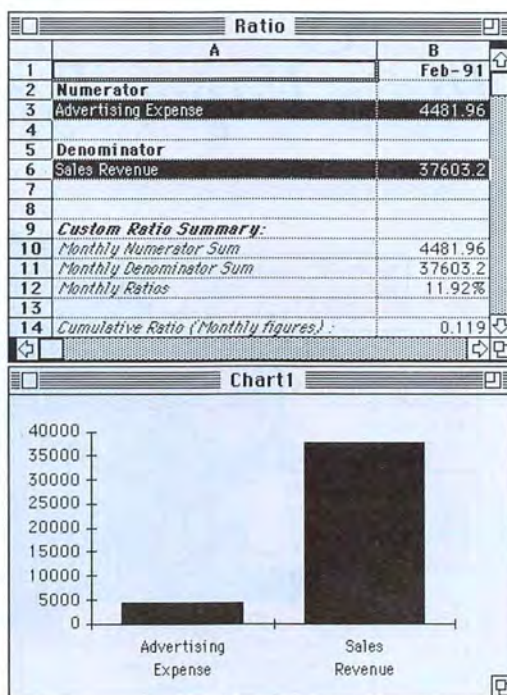


REVIEWS

amounts. All column headings and blank rows in the trial balance must be removed, and the G/L account number and the amounts must be numbers only.

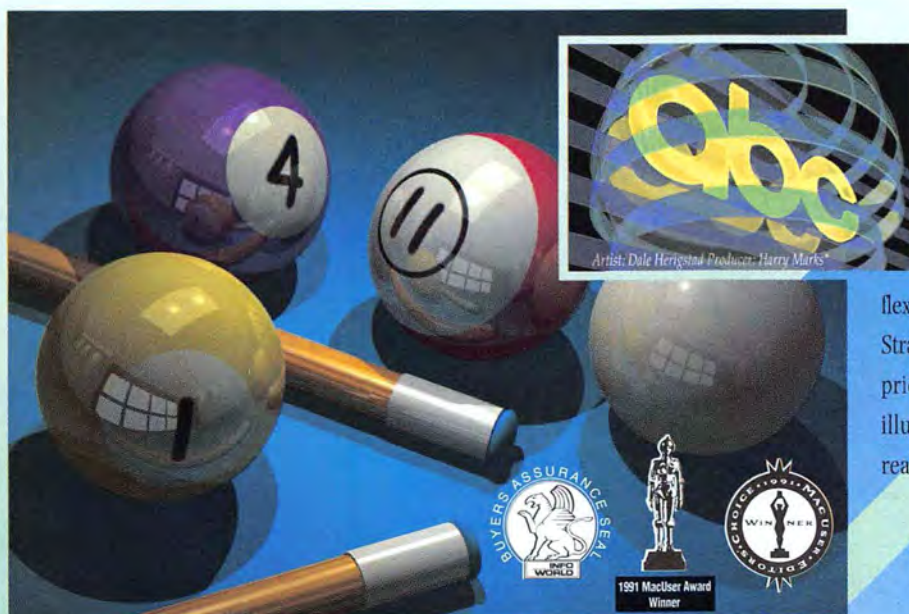
Because many accounting programs support alphanumeric G/L account numbers, this is a surprising limitation. And even though Evolve includes powerful parsing commands to help you format the data, the procedure is time-consuming. Most users will probably resort to a spreadsheet or word-processing program to format their data, and some may find that it takes less time to type data directly into an Excel worksheet than it does to import and reformat it.

Evolve comes with predefined charts of accounts for proprietorships, estates, partnerships, and corporations. The accounts fall into eight general categories, and the number of accounts in each category is fixed. Each data set can comprise as many as 99 departments. Before you can load data into a new data set, you must manually allocate each account in your source file to the correct account



Evolve creates ratios that let you compare accounts and displays them in worksheet format. It uses Excel 3.0's charting tools to graph the data.

PHOTOREALISM



Artist: Jon Watson; image modeled and rendered entirely in StrataVision 3d.

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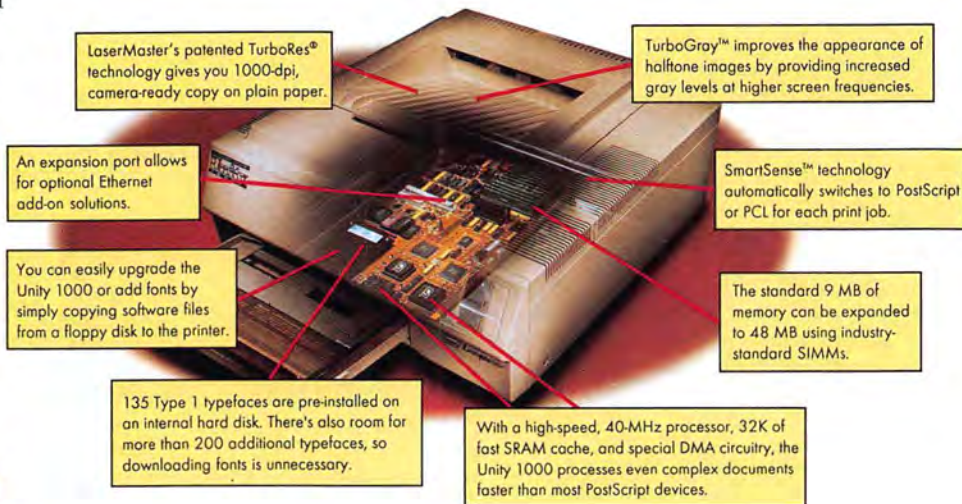
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in Evolve's chart of accounts. Depending on the length of your chart of accounts, this tedious process can take hours. Evolve's strength lies in its ability to store five years' worth of data. In addition to standard monthly income statements and balance sheets, you can print comparative income statements and balance sheets that include data from any number of specified months during those five years. If the program's predefined reports don't suit your fancy, you can design your own, using Evolve's report editor.

To quickly compare accounts or account groups with one another, you use Evolve's ratios. For example, a ratio might compare total sales with the cost of goods sold. Evolve generates ratios as worksheets that include dollar values as well as the percentages by which the compared amounts differ. You can graph such data with a single command.

When you're generating a budget for income and expenses, it's best to start by studying past data. Evolve automati-


cally generates budget worksheets based on past activity for use as the starting point for future budgets, and you can use Excel formulas to project budget growth.

Evolve includes seven predefined financial charts, including assets breakdown, income versus expenses, and instant profit picture. It can also create custom graphs with the numbers from virtually any report (all of Excel's graphing features are available).

The Bottom Line

Although Evolve rightly targets the need for flexible reporting tools in accounting packages, the solution it provides is too costly, in both dollars and time. If you need to create monthly reports, for example, you'll find yourself spending an excessive amount of time each month formatting your accounting data to meet Evolve's requirements. As a result, you may as well save the \$195 cost of Evolve and use Excel alone to format your reports.

However, an even better solution

should be available in the near future. Dedicated report generators are being developed for many popular Mac accounting packages. These stand-alone programs read data directly from the accounting program's files, eliminating the tedious process of reformatting, exporting, and importing the data. They may cost a bit more than Evolve, but they don't require Excel and they can save you a lot of time. 

— Darryl Lewis

Get Info

Evolve

 1/2

Published by: Absolute Solutions, Inc., 3142 Vista Way, Suite 400, Oceanside, CA 92056; 800-633-7666 or 619-966-8000.

Version: 1.01.

List Price: \$195.

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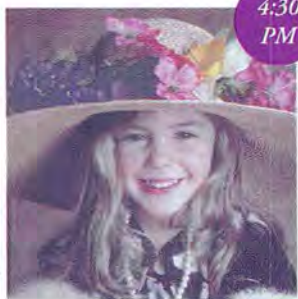
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Efi

4:30
PM



*"Scanned in
too light"*

4:31
PM



*"Too blue,
use the
color filter"*

4:33
PM



*"No color,
pump up the
saturation"*

4:42
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TwinIt



The best backup to have is the one you made right before your hard-disk drive crashed. Of course, you probably didn't make one then — but if you'd had Golden Triangle's TwinIt, you'd have been in luck. TwinIt is a control panel that provides continuous backup of any SCSI volume you can mount on the desktop, but this excludes most tape drives. Whenever the Mac writes to one drive, TwinIt writes identical information to a second, "twin" drive, constantly providing you with a current backup.

Setting up TwinIt is simple. Drop the control panel into the System Folder, and then use it to designate the primary and twin drives. Ideally the drives should have identical capacities, because twinning to a larger drive renders the larger drive's excess capacity inaccessible for other purposes. You can't twin partitions, nor can you twin more than one pair of drives.

Before you can turn twinning on, you must click on a button to synchronize the drives, which means copying everything from the primary drive to the twin. How long synchronizing takes depends on your Mac and the drives' speed and capacity. Our 200-megabyte Maxtor drives took ten minutes to synchronize on our Mac IIci benchmark station.

Be aware that TwinIt protects you only from data loss due to disk failure, not from other types of problems. When twinning is on, anything you do to the primary drive is automatically done to the twin as well — for better or for worse. There's no special protection against viruses, power problems, accidental erasure, software corruption, or pilot error. Therefore it's a good idea to make an archival backup as well, which is easy to do by alternating backup of the drives every other day, using removable media such as Bernoulli or SyQuest cartridges.

If your primary drive ever suffers a hardware failure such as a head crash, you can bring the twin into service. Unlike DiskTwin (Golden Triangle's \$999 high-performance hardware-based mirroring product), TwinIt doesn't seamlessly cut over to the twin; you have some downtime while you mount and unlock the twin.

Aside from TwinIt's \$199 cost, the only price you pay for continuous backup is reduced speed during writes to the primary disk. In our tests, disk writes took 40 to 50 percent longer when TwinIt was turned on; this percentage may vary with different hardware. TwinIt shouldn't generally make reading from disk take longer, but with applications such as Photoshop that create scratch (temporary) files on-disk, it sometimes does. TwinIt can be disabled at any time, but you must resynchronize the drives before you turn it back on.

If you want data security and peace of mind without the hassles of traditional backup software, using TwinIt is about the easiest way to go. Granted, you pay a performance penalty and must invest in an extra drive, but when your primary drive dies and the twin saves the day, both will seem like small prices to pay.

Golden Triangle Computers, Inc., 4849 Ronson Court, San Diego, CA 92111; 800-326-1858 or 619-279-2100. Version 1.0. \$199.

— Owen W. Linzmayer



NetModem/E



Until recently, *versatility* was not exactly the word that came to mind for describing modems. Sure, some modems could handle both data and fax, but not until Shiva's NetModem/E hit the shelves did we get a truly multitasking device. The NetModem/E is an Ethernet device that, without using a Mac as a dedicated communications server, handles one of three key tasks on a network: shared network dial-out over a single phone line, remote dial-in, or remote routing of AppleTalk or IPX packets over phone lines. All of the modem's talents can be shared on mixed Novell NetWare/AppleTalk networks by Macs and PCs — one user at a time, of course, for dial-in and dial-out.

The NetModem/E hardware consists of a sleek, compact 14,400-bps modem that comes with a built-in Ethernet interface. Ethernet interface options include thinnet, thicknet, AAUI, and 10BASE-T. The device features V.32bis and V.42bis support.

The software provided with the package is easy to install and use. For dial-out purposes, the software supports most popular communications packages, so you don't have to learn another program

in order to use the modem.

Because you can't see or hear the remote device you're accessing, Shiva makes sure you're not left in the dark by including a tiny virtual-modem icon, complete with indicator lights, in the menu bar. As the remote modem dials and connects to outside services, you hear a simulated version of the familiar dial tone, beeps, and connection roar, so you always know how your calls are progressing.

For System 6 users, the NetModem/E's dial-in software provides a much more efficient way to connect to the network and collect E-mail than a remote-control package such as Timbuktu does. (With AppleTalk Remote Access, System 7 users already have dial-in capabilities similar to the NetModem/E's.) Instead of controlling a host machine remotely, as with remote-control software, dial-in users become actual nodes on the network. No separate communications software is required for connecting to the network — all you need is a modem.

The NetModem/E comes with Shiva Net Manager software for configuring the modem from any workstation on the network. Particularly noteworthy is Net Manager's ability to download firmware upgrades to the modem so you never have to disconnect the device to maintain it.

Overall, the NetModem/E is elegantly implemented and eliminates the need to dedicate a Mac as a network communications server. At \$1,699, it may seem pricey, but compared with a dedicated Mac and multiple modems scattered over a network, it is relatively affordable.

Shiva Corp., One Cambridge Center, Cambridge, MA 02142; 617-252-6300. \$1,669.

— Susan Janus



Pro Tools



Digidesign, the company that defined digital audio on the desktop, has forged a new definition with Pro Tools, a powerful recording and editing system for your 68020 (or later) Mac.

The Pro Tools package includes a NuBus digital Audio Card and rack-mountable Audio Interface module, plus ProDeck and ProEdit software for mixing and editing. Pro Tools allows desktop-recording engineers to move beyond

the physical limits of a tape-based system to a new way of producing music. A single Pro Tools card lets you play back on 4 tracks simultaneously and instantly access as many as 32 virtual tracks (which exist only in memory or on-disk). Virtual-track access gives you the freedom to experiment in ways not possible in the analog world, because you can try instant variations of your recordings without tape juggling or lower sound quality.

The Audio Card, a Motorola 56000 DSP-based (digital-signal-processor-based) NuBus card, has four analog audio inputs and four outputs for recording and playback. The card also comes equipped with two digital inputs and two outputs (AES/EBU or S/PDIF) that let you import a DAT (digital audiotape) recording, edit the tracks, and export them back to DAT without ever leaving the digital domain. However, the card doesn't include the DACs (digital-to-analog converters) and ADCs (analog-to-digital converters); Digidesign has moved them into the separate Audio Interface module to improve encoder performance.

Digidesign has outdone itself by designing this system with 18-bit DACs to provide sound quality unparalleled in any other Digidesign product. Pro Tools lets you capture audio at either 44.1 kilohertz for CD-quality sound or 48 kilohertz for DAT-quality sound.

If you need more than 4 simultaneous tracks, you can add as many as three additional Audio Cards (and their accompanying Audio Interface modules) at 4 tracks per card, for a total of 16 tracks. If you add one or more of these extra Audio Cards, you'll also need Digidesign's System Accelerator, a 68020-based accelerator card (\$3,500).

For mixing tracks, Pro Tools includes ProDeck, an upgraded version of Digidesign's award-winning Deck program. With ProDeck, you can assign channels and set levels, equalization, and effects parameters. ProDeck's interface mimics a studio engineer's mixing console, so if you have studio experience, you will find it easy to learn. ProDeck uses a tape-transport metaphor for its controls and includes basic MIDI sequencing options. When you're finished recording, you can use ProEdit to rearrange your audio (and MIDI) tracks by cutting and pasting, or you can alter your tracks' actual waveforms with the program's optional Sound Designer II (\$995).

ProDeck and ProEdit each give you a wealth of options. The original shipping versions had some bugs — moving between software modules, for example, could cause system crashes — but they should be fixed in version 1.1 by the time you read this.

Digidesign has provided audio engineers with an extremely powerful tool at a remarkably reasonable price. (New England Digital's Synclavier, for example, costs well over \$250,000.) Pro Tools offers so much for just \$5,995 that there really is no alternative.

Digidesign, 1360 Willow Road, #101, Menlo Park, CA 94025; 415-688-0600. Version 1.0. \$5,995.

— Stefan B. Lipson



Sherlock Holmes, Consulting Detective



Over the years, many manufacturers have proclaimed their games to be interactive movies, but Sherlock Holmes, Consulting Detective (an official product of Arthur Conan Doyle's estate) is the first game that truly delivers. It features more than 90 minutes of live-action video, for which you need a Mac LC or higher with a color monitor and System 6.0.7 or later. Sherlock uses ICOM's exclusive video-digitization process, which displays video at 15 frames per second with synchronized audio from a CD. ICOM went all out to make the video segments movielike, filming 25 actors in more than 70 costumes on 25 Victorian-era sets. The result is the most realistic interactive computer game yet.

The CD contains three mysteries: The Mystified Murderess, The Tin Soldier, and The Mummy's Curse. Each has an introductory video clip that provides all the information you need to get started.

The interface consists of a video screen surrounded by resource icons. Your most valuable resource is the directory, an alphabetical reference guide to the people and places of Sherlock's London. Each name has an associated video clip that lets you interview a witness or suspect; examine the scene of the crime; or get vital information from a location such as the library, Office of Records, Scotland Yard, or Chief Medical Examiner's

office. Beware, however: Some people lie, and red herrings abound.

The London Times contains vital clues. Additional resources include Sherlock's private files, which contain useless information as well as clues; the Baker Street Irregulars, Holmes' group of street watchers, who can help you sort the clues from the red herrings; and your notebook, which lets you copy names of people and places you want to check out.

You get points, which are more like demerits, every time you use a resource; the object of the game is to solve the case with as few points as possible. When you think you have the solution, you click on the gavel icon and take your case to court. Answer the judge's questions correctly, and you'll get a video clip of Holmes bragging about how he solved the case. One mistake, though, and you're sent back into the field for more information.

If you like a good mystery, you'll love Sherlock Holmes, Consulting Detective, and you'll be happy to learn that a sequel will be available early next year.

ICOM Simulations, 648 S. Wheeling Road, Wheeling, IL 60090; 708-520-4440. Version 1.00. \$69.95.

— Bob LeVitus



Intersect CDR-73M



The NEC Intersect CDR-73M adds the most useful feature you can think of for a CD-ROM drive: speed. For the same price as the older CDR-73, NEC doubles the throughput of the earlier model with a technological innovation. The access times are still eight to ten times as long as for erasable optical discs, and most CD-ROMs have only modest performance gains, but the CDR-73M does make running QuickTime movies directly from CD-ROMs practical and even desirable.

The Intersect CDR-73M drive is the first dual-speed CD-ROM drive for Mac users. For audio tracks, the drive uses the ordinary CD-ROM maximum rotational speed — usually about 250 rpm at the center of the disc. For data tracks, the CDR-73M doubles the rotational speed to achieve a 280-millisecond access time and effectively doubles the throughput. The CDR-73M can detect whether a track is data or audio and can switch between

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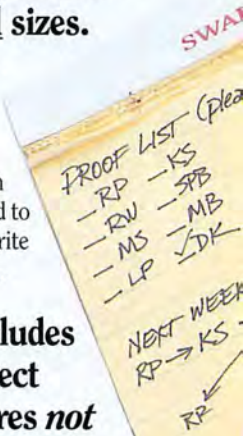
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the two speeds on the same disc, speeding up for the data portions and slowing down for the audio tracks so that Verdi doesn't sound like the Chipmunks.

Data throughput to your Mac is aided by an efficient 64K cache, which helps smooth out animated images coming directly from a CD-ROM disc. In our tests, this improved throughput was most apparent with QuickTime movies, which ran much more smoothly on the CDR-73M than on other CD-ROM drives. Other multimedia discs don't fare as well, however, since they're timed to make sure that animation and sound are in sync even on the slowest CD-ROM drives.

We tested the CDR-73M against a TurboDrive CD-ROM drive, from Peripheral Land, using an 8-megabyte Ilii with the disk cache set to 128K. The CDR-73M proved to be about 13 percent faster during a Finder copy (dragging a 10-megabyte folder containing 80 files from a CD-ROM to a hard disk), but it ran about 18 percent *slower* than the PLI drive while navigating through a Brøderbund children's CD-ROM called Just Grandma and Me — probably because of the timing factors mentioned for non-QuickTime multimedia. Perhaps for similar reasons, a MacroMind Director animation was no faster on the CDR-73M than on the PLI drive. Two HyperCard tests (opening a stack on a CD and doing a search) also ran at virtually the same speed on both drives.

The CDR-73M's hardware has some deficiencies and some advantages. Because the SCSI ID comes preset to 0 (the default setting of Mac internal hard drives), most Mac users will have to change the ID to another number — it isn't easy, though, because you have to set the address on an awkwardly recessed rear-panel DIP switch. However, the power switch is conveniently located on the front panel, as are the volume-control dial and the headphone jack for playing audio CDs (there are also stereo-output jacks on the back). And by the time you read this, you'll be able to buy a CDR-74 instead of a CDR-73M for \$30 more and get the added features of double doors (for better dust protection) and socketed firmware (for snap-in upgrades).

Overall, we can recommend the NEC Intersect CDR-73M. Its enhanced performance with QuickTime will save you from having to copy CD-ROM multimedia presentations to a big hard disk. In the future, we hope to see other types of

CD-ROMs that take advantage of the CDR-73M's relatively high throughput.

NEC Technologies, 1255 Michael Drive, Wood Dale, IL 60191; 708-860-9500. \$684.

— John Rizzo



TrashMaster



Shredder



If you need more control over when and how you empty your Trash and how thoroughly you destroy it, you should know about TrashMaster and Shredder. TrashMaster concentrates on when and how to trash your data, whereas Shredder specializes in thoroughly destroying it.

TrashMaster is a control panel that adds menu controls and filtering to Trash emptying. The menu controls transform the Empty Trash item on the Finder's Special menu into a hierarchical menu, so you can choose to empty the Trash by disk drive, volume, folder, subfolder, or even by file. We found this feature awkward and wished we could turn it off.

The filtering feature lets you create filters to define when to empty which part of your Trash. Filters let you determine whether to empty the Trash at a particular time, such as hourly or daily, or when events such as startup or shutdown occur. You can also create filters for trashing files with specific attributes such as a designated size or age. Because System 7 retains Trash items until you empty them, filters may come in handy for the terminally forgetful; however, we felt they were techno-overkill.

In the realm of deliberate overkill, a special Incinerate filter automatically erases files of defined types (for example, temporary and print-spool files) when they're deleted either by TrashMaster or by an application. TrashMaster includes an option to erase files according to Department of Defense (DOD) specifications (three writes).

If three writes isn't drastic enough for deleting your confidential data, however, you're better off with Shredder. A System 7-savvy application for erasing files and disks, Shredder actually shows up on your desktop as two icons representing the interdependent applications Shredder and Scrubber.

Shredder deletes files by overwriting them in one of three ways you can choose: all zeros, random data, or DOD specification 5220.22m. Scrubber erases unused areas of a volume or file, using one of the same three options. Both applications prevent file-recovery programs from retrieving erased information.

You can use Shredder and Scrubber in several ways: You can simply drag and drop file or disk icons onto the Shredder or Scrubber icons and use them as you use the Trash. You can also double-click on the icons to gain more options for shredding and scrubbing. You can set interval shredding or scrubbing to work in the background at a specific time, as you can with TrashMaster's time-based filters. Or you can access Shredder and Scrubber Apple events with such programs as HyperCard, QuickKeys, or UserLand Frontier.

You need to launch Shredder and Scrubber directly at least once to set your erasure, timing, and sound preferences (you can assign a grinding, shredding, or chopping sound to play continuously during shredding or scrubbing). For us, the novelty of the sounds wore off quickly; we turned them off after the first run.

Shredder's 46-page manual is easily understandable, and the program itself worked smoothly in all our tests. It did balk at locked files, but it skipped over them without interruption or damage.

Shredder requires System 7, as do most features of TrashMaster (the Incinerate function can work under System 6). Overall, we found Shredder fast and reliable. TrashMaster provides more flexibility and control for emptying the Trash, but we aren't certain how many people will really use all of its features.

Shredder, DLM Software, 3525 Del Mar Heights Road, Suite 319, San Diego, CA 92130; 619-283-2343. Version 1.0.1. \$69.

TrashMaster, Utilitron, P.O. Box 811, Allen, TX 75002; 800-428-8766 or 214-727-2329. Version 1.1. \$69.95.

— Tom Petaccia



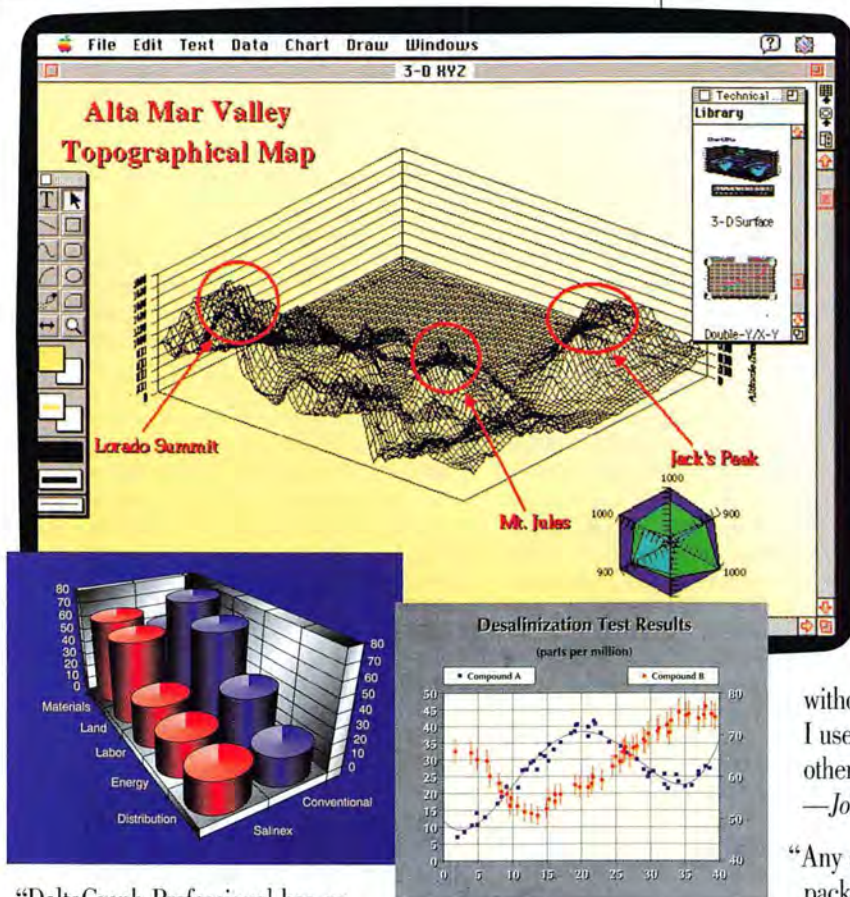
A Silly Noisy House



The package describes it as "an animated audio toybox," but that description doesn't do it justice. A Silly Noisy

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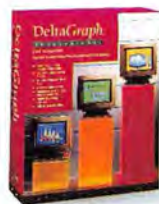
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House is an imaginative pastiche of clever animations, delightful sounds, and familiar songs that will surely capture your three-to-eight-year-old's heart.

A Silly Noisy House is easy to install and even easier to play. If you can click the mouse, you have all the skill it takes; even three-year-olds get the hang of it in minutes. You move from room to room by clicking, and you activate items in the rooms by clicking on them.

Every room contains dozens (if not hundreds) of toys and common household items; clicking on an item makes an animated sequence, a song, or a sound play.

The popcorn popper goes into action with mouth-watering sound effects. The oven reveals a different delicacy, such as a birthday cake that magically transports you to a birthday party, each time you click on it. There's a hatbox filled with fanciful hats that change with each mouse click, and there's even a skeleton in the closet — a teddy-bear skeleton that dances a jig. The music and sound effects throughout the game are superb.

The only drawback is the required hardware investment — a color Macintosh, 2 megabytes of RAM, a hard drive with at least 6 megabytes available, a CD-ROM drive, and external speakers or headphones. Even so, if you've got the horsepower, this is one of the best ways we've seen to use it.

Our test subjects — editors' kids and neighbors of editors' kids — who are bored by much of the software we try on them, never seemed to tire of A Silly Noisy House. The younger ones liked it best, but even the eight-year-olds played for hours. Several months after it arrived, they were still playing it almost every day. That's a powerful endorsement indeed.

The Voyager Company, 1351 Pacific Coast Highway, Santa Monica, CA 90401; 800-446-2001 or 310-451-1383. \$59.95.

— Bob LeVitus



CameraMan



If you need to capture screens and on-screen actions for training materials or software demonstrations, you should know about CameraMan. It allows you to capture screen action into a QuickTime movie, a PICS file, or a series of sequential PICT files — and, unlike

Farallon's MediaTracks, it captures color.

CameraMan consists of a system extension and an application. The application runs in the background under either System 7 or MultiFinder (for System 6.0.7 users) and allows you to set a variety of options such as recording speed, which area of the screen to capture, and which keys to press to stop and start capture. You can record the entire screen or an area you select (either graphically or by typing numerical screen coordinates). Or you can use the Follow Cursor option to record a fixed-size area surrounding the cursor as it moves around the screen.

CameraMan lets you determine your own trade-off between image quality and amount of compression when recording QuickTime movies. Although the documentation strongly recommends using the default CODEC (compressor/decompressor) settings (best quality, lowest compression), our experiments with the higher-compression CODEC settings let us reduce QuickTime file size by almost 30 percent without degrading image quality unacceptably.

We found CameraMan very limited in its capture speed. On a IIx set to 8-bit video, the maximum recorded frame rate never really rose above 4.5 fps (frames per second), even though CameraMan lets you set much higher frame rates. If you're thinking of creating a tutorial for a 32-bit painting, 3-D, or animation program, be forewarned: You'll need to set the display to 8-bit video if you want 4-to-6-fps speed. To get higher frame rates, you need to lower the depth settings to 4-bit or to black-and-white, which can work well for word-processing and database programs and other types of software that don't require color.

One obvious omission in CameraMan is that you can't use an LC/si/Quadra microphone or a MacRecorder to record audio into a QuickTime movie as you create it. You can use a QuickTime editor such as Adobe's Premiere or DiVA's VideoShop to mix audio into the movie after you've created it, but most people would rather narrate during the capture and have that narration available as a reference. Aside from this oversight, CameraMan is a useful utility for QuickTime trainers and demo makers.

Vision Software, 3160 De La Cruz Blvd., Suite 104, Santa Clara, CA 95054; 408-748-8411. Version 1.0. \$149.

— David Biedny



Life Forms



If you've ever tried to describe human movements in words, you know that showing beats telling every time. And if you want to show complex human motion on a Mac, Life Forms is the way to go. The program, originally developed for choreography and priced at \$1,200, has been acquired by Macromedia and released at the much more reasonable price of \$495.

Life Forms works by interpolating motion between keyframes — that is, it fills in the motion necessary to create smooth transitions from one body position to another. The interface for positioning each body part is intuitive, so even beginners can enjoy virtually instant gratification. Although the program can't address minute details of human anatomy (hands, for example, are fingerless, and you can forget about facial expressions), it gives you enough control to simulate fairly intricate motions, as the sample files of dancing and running demonstrate.

If you want your animated humans to look as realistic as their movements, you need to do some exporting; Life Forms' humans are strictly wire-frame figures. Fortunately, Life Forms is compatible with Swivel 3D Professional, Macromedia's 3-D-modeling software. You can save a Swivel animation script that drives an included set of Swivel body parts, and you can modify the Swivel files to create your own, more lifelike, 3-D-rendered humans. You can also save your animations in PICS and QuickTime formats, but then you can play them only as wire frames.

The program's interface, although fairly straightforward, sometimes feels slightly cluttered. There are so many menus and submenus that the tear-off-menu feature can actually be a minus instead of a plus, because it adds to the clutter. However, once you've gotten used to the program's interface, you'll probably spend hours trying out strange moves that would break the back (and other body parts) of a real Homo sapiens. If your world requires animated people, Life Forms is a necessary and fun tool.

Macromedia, 600 Townsend Street, Suite 310W, San Francisco, CA 94103; 415-442-0200. Version 1.0. \$495.

— David Biedny

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The Right Word Processor

Don't be fooled by lists of features. Your work should determine which word-processing program you pick.

Here's how the leading packages compare.

BY TED LANDAU

In spite of the telephone, written words are still a primary means of communication. Maybe we have fax machines to thank for that, but whatever the reason, because we have so much more to communicate these days, word processors have become as essential as paper — and as complex as relativity theory.

Choosing a word processor doesn't have to be complex or confusing, however, if you start by asking yourself one simple question: What do I do most often? If you know the jobs you're most likely to do with your word processor, picking the most appropriate package can be a snap.

To help guide you, we've divided the spectrum of typical word-processing tasks into five categories: short, medium, and long documents; page layout; and merge documents (see Table 1). Within each category, we've focused on the key features necessary for success at that task (see Table 2).

In deciding which program was best suited for a given category, we considered how well the key features were implemented and how easy the program was to learn and use.

The Competition

We reviewed six word processors: three midlevel programs — MacWrite II, Taste, and WriteNow — and three high-end — Microsoft Word, Nisus, and

WordPerfect. Although there is some overlap between the two levels, only the high-end applications include such features as indexing, tables, outlining, and macros.

Price is also an issue. You can pick up a midlevel program for about \$100, whereas a high-end package can cost four times as much.

MacWrite II. The easiest to learn of any of the word processors, MacWrite II also has the fewest high-end features. MacWrite Pro, Claris' souped-up version of MacWrite II, should be out soon (see the "Coming Soon: MacWrite Pro" sidebar).

Taste. With style sheets, an integrated address-book database, and exceptionally strong graphics options, Taste is surprisingly full-featured for a mid-level package. In its initial release, Taste was plagued with system-crashing bugs and slow performance; the current version, 1.02c, is faster and more stable.

WriteNow. Fast, small, and RAM-lean, WriteNow 3.0 retains the sleek design of its predecessors. WriteNow has more features than MacWrite II, and version 3.0 includes style sheets.

Microsoft Word. Word is the program that first defined high-end word processing on the Mac. In version 5.0, Microsoft has added several new features aimed at overcoming Word's reputation as an un-Mac-like program.

Nisus. Nisus is a full-featured word processor

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with superb text-manipulation tools, but some of the tools are very awkward to use, especially compared with those of the other packages.

WordPerfect. Despite its DOS heritage, WordPerfect 2.1 emerges with a crisp and clean interface that belies its underlying complexity. Although it's WYSIWYG in some respects, there are some curious lapses too. Still, WordPerfect has excellent graphics features and was the first word processor to support QuickTime. (Word 5.0 has since joined the ranks as well.)

Short Documents: Bread and Butter

All the word processors we reviewed have the basic tools for short-document tasks: paragraph formatting with rulers, font and style selections, find-and-replace, and the ability to paste pictures from the Clipboard. Also now standard are a spelling checker and a thesaurus.

If letters and memos represent the bulk of your work, you don't really need much beyond these basic tools. In the short-document category, well-implemented simplicity surpasses feature-rich complexity.

How They Stack Up. Easy-to-use, intuitive, and WYSIWYG. These terms just about sum up MacWrite II. MacWrite II's menus and dialog boxes are clearly laid out and easy to follow (see Figure 1). All aspects of the program work exactly as you would expect. MacWrite II gives you just one view of your document; there's no cumbersome switching between page-preview modes and no separate windows for headers and footers.

MacWrite II includes just a few "beyond the basics" features, but they are well chosen. For example, it makes invisible characters such as tab markers and returns visible, and it has the only built-in spelling checker that can

Coming Soon: MacWrite Pro

MacWrite Pro is Claris' long-overdue and much anticipated upgrade to MacWrite II. With any luck, it should ship sometime this fall. Judging from an early beta version, MacWrite Pro will be well worth the wait. Despite the addition of numerous high-end features, the package retains MacWrite II's ease of use and simplicity.

One of MacWrite Pro's most significant features is a table function whose flexibility and range of options compare very favorably to those of Microsoft Word's table function and that is easier to use.

MacWrite Pro also has greatly expanded page-layout capabilities. Especially welcome is the ability to place a text or graphic object anywhere on a page, complete with text runarounds. With this frame-placement feature and MacWrite Pro's tool palette, you can easily create customized borders around a frame and then shade it by choosing from 64 colors.

Best of all, MacWrite Pro includes true style sheets that follow WriteNow's lead of permitting both paragraph- and character-based styles. MacWrite Pro also supports section divisions and variable-width columns, and it even lets you restart page numbering with each new section.

Rounding out the list of notable features, MacWrite Pro lets you stick electronic Post-it-type notes onto a page, in case you want to make annotations or comments. For System 7 users, MacWrite Pro supports publish-and-subscribe.

Despite all these features, MacWrite Pro is still MacWrite at heart. Some high-end features — including indexing, outlining, a glossary, and the ability to create tables of contents — are still missing. And although MacWrite Pro's page-layout

alert you to spelling errors as you type. It also has a feature that lets you assign a name to a particular combination of type font, style, and size so that you can reapply it by using a single command. Unfortunately, the program doesn't recognize such user-defined combinations as "true" styles,

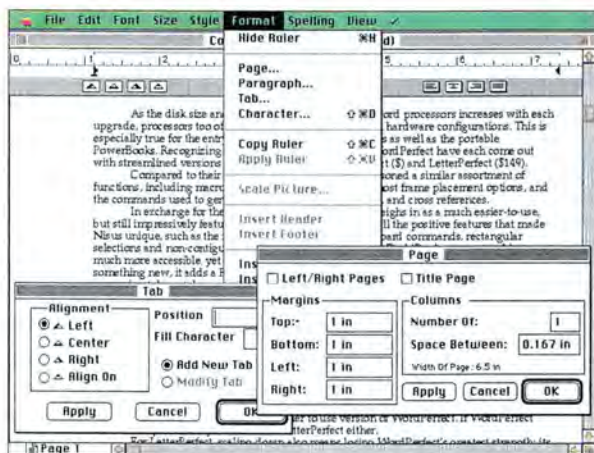


Figure 1: MacWrite II may not have many bells and whistles, but complexity isn't its goal. With its simple but functional text ruler, clearly structured menus, easy-to-follow dialog boxes, and a true WYSIWYG display, MacWrite II makes word processing as easy as it gets.

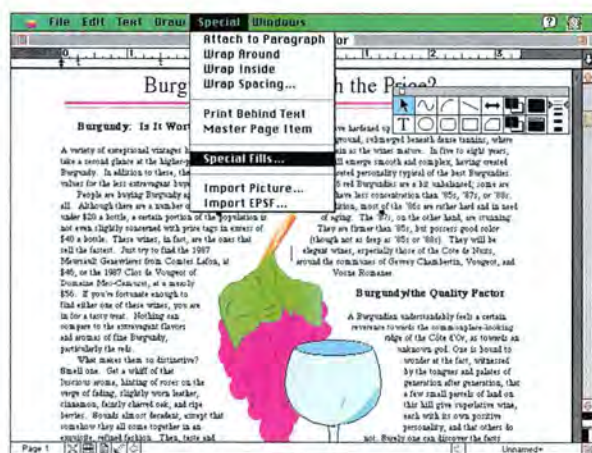


Figure 2: Taste is great at placing graphic and text objects. A separate graphics editor works transparently over the text layer, making it a breeze to add borders, fills, and simple objects. Taste is also the only word processor that lets you run text around an irregularly shaped border.

features are much improved compared with MacWrite II's, they don't match WordPerfect's or Taste's.

Overall, MacWrite Pro seems well positioned to retain its appeal to entry-level users while simultaneously broadening its base to include a significant segment of the high-end market.

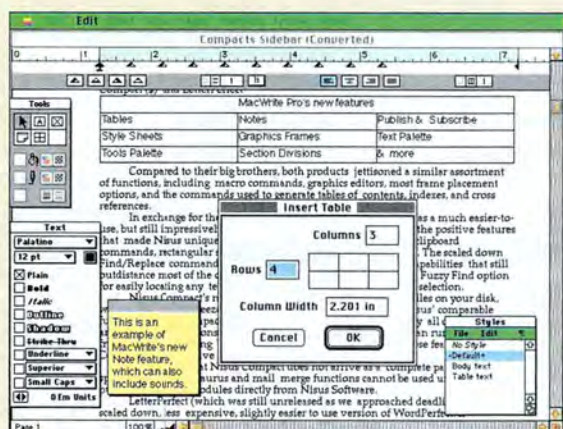


Figure A: MacWrite Pro, a major upgrade to the classic MacWrite II, has a host of new features but retains MacWrite's simplicity. Among the new features are tables; notes; and style, text, and tool palettes.

so if you change any part of the combination, MacWrite II doesn't change other occurrences of that style to match.

If you frequently include graphics in your documents, Taste may be a good bet. In addition to the basic tools, Taste has a MacDraw-like tool palette for creating and

editing graphics and gives you almost total flexibility in placing graphic objects (see Figure 2). Taste's major drawbacks are its lack of speed (it's significantly slower than MacWrite II) and a somewhat cluttered interface.

WriteNow is another good choice for short documents, although it does have some distinctly cumbersome design features. For example, to set the left and right margins, you use the Page Setup dialog box, but to set the top and bottom margins, you have to set the size of headers and footers separately.

For those willing to shell out the extra bucks, Word is a viable choice too. You can configure Word's menus to hide most of the high-end commands, giving it the superficial appearance of MacWrite II. The advantage of choosing Word for short documents is that if you ever need to move up to a more powerful application, you'll already own it. Word 5.0 includes such welcome new ease-of-use features as an icon-button "ribbon" that gives you ready access to character- and paragraph-formatting commands; it also has a drag-and-drop feature, which lets you move selections directly, without copying and pasting.

Both WordPerfect and Nisus are too top-heavy to be on the recommended list for this category, but Nisus has unique text-editing features that are useful no matter what the document length. They include multiple levels of undo, as many as ten Clipboards, an Append to Clipboard command, and the ability to make rectangular and noncontiguous text selections.

Medium Documents: Business/Academia

Even for the simplest medium-length document, headers and footers are necessary, if only for including page numbers. All the programs we reviewed can generate

Table 1: Word-Processing Tasks

	Typical Examples	Key Requirements	Recommended (in order)
Short documents	Letters, memos, brief reports, simple fliers.	Ease of use, basic text formatting, ability to paste graphics.	MacWrite II Taste Word
Medium documents	Business reports, academic manuscripts, business proposals.	Headers and footers, find-and-replace, tables, outlining.	Word
Long documents	Books and manuals.	Style sheets, tables of contents, indexing, cross-referencing, section divisions.	Word WordPerfect Nisus
Page layout	Newsletters, presentations, documents that include graphics.	Frame placement, column formatting, graphics importing and editing.	WordPerfect Taste
Merge documents	Form letters, labels, automated documents.	Smooth print merge.	Word Taste MacWrite II

Word-Processing Programs

simple headers and footers, and some can do more, producing different headers and footers for facing pages, for instance.

Another essential feature present in all six programs is find-and-replace. In most of the programs, this feature lets you do more than just locate a specific text string; you can also search for matches based on such attributes as font, size, and style. Most of the packages also let you search for invisible characters such as tabs and paragraph markers, and the best ones let you define search strings by using wildcard and other specialized characters.

Tables and outlines are two other features you need for writing medium-length documents. Both are helpful for organization and presentation. A glossary feature provides a quick way of adding recurring phrases or graphics to a document. If you write formal or technical documents, footnote, endnote, bibliography-citation, and equation-writing functions may all be important.

How They Stack Up. For headers and footers, Word is the only program that lets you have separate sections, each with its own page-numbering sequences. WordPerfect loses points, because you can view headers and footers (as well as footnotes, for that matter) only in Print Preview mode. MacWrite II is the only program without options for multiple or odd/even headers and footers.

When it comes to find-and-replace, Nisus deserves special mention. Combining wildcard matching with Boolean-type search criteria, Nisus' search capability is far more powerful than that of any of the other packages. But mastering all this, particularly at the PowerSearch+ level, requires considerable effort — more than most users are likely to be willing to make (see Figure 3). Word's and WordPerfect's find-and-replace functions are easier to use and should be adequate for all but the most demanding users. WriteNow is the only word processor without any attribute-searching capability.

If you need to include tables in your documents, you have two choices: Word or WordPerfect. Word's table-generating commands are so outstanding that they could have been marketed as a separate application (see Figure 4). If you've ever tried to create a table by setting multiple tabs, you'll quickly appreciate what Microsoft has accomplished. With Word, you can almost instantly create a table of any number of rows and columns, with or without borders. Text always remains within a cell as you type, because the row height expands to accommodate the amount of text. You can merge or delete cells as desired, sort the data based on any column, and use basic math functions.

WordPerfect's table features are more limited in scope. For example, you can't select a column of cells in a table and you can't merge cells, largely because you form tables by using a variation of WordPerfect's column-formatting commands rather than true table commands.

Word scores again with the best outline-processing capabilities. You can shift between the Normal and the

Outline views of the same text. When using the Outline view, you can collapse, expand, and move headings, much as you would with the Acta or MORE outlining programs, but if you want to change the look of a heading, you have to leave the Outline view and enter either the Page Layout or the Normal view. WordPerfect's outlining function can do neither of these things. Nisus' outlining function is inconveniently hidden within a separate macro file and is so slow and clumsy as to be almost useless. The other word processors have no outlining features at all.

Long Documents: Writing Pros

Once you've started using style sheets, you'll wonder how you ever managed to write without them. They're probably the most critical feature for successfully writing

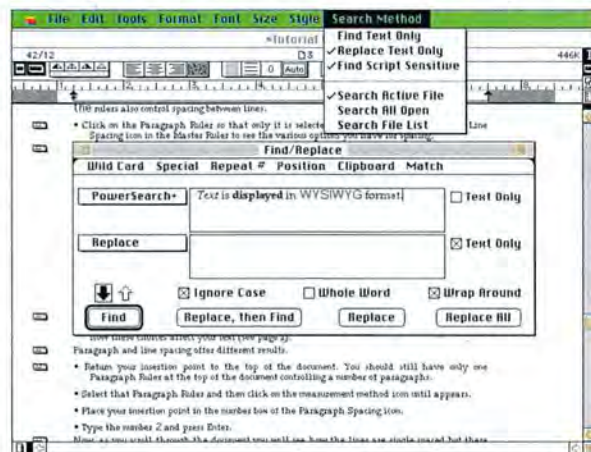


Figure 3: Nisus' find-and-replace adds a Search Method menu to the menu bar, and at the PowerSearch level, the Find/Replace dialog box adds pop-up menus and its own mini menu bar. Originally developed to aid in writing programming code, PowerSearch is useful for any type of writing — if and when you get the hang of it.

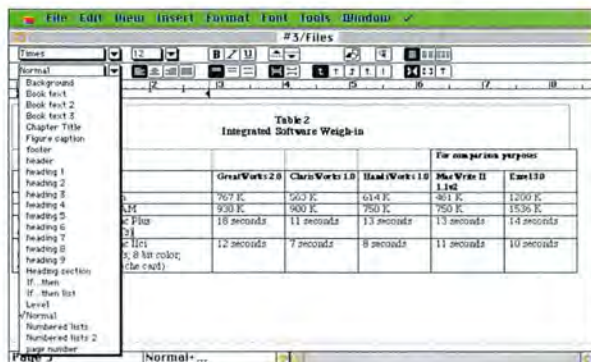


Figure 4: Users may grumble about its weak spots, but Word tops the competition in more categories than any other word processor. Shown here are three of its better features: tables, style sheets (accessible from a pop-up menu in the ruler), and a tool ribbon (located directly above the text ruler) that lets you select frequently used commands quickly.

Small Words: Nisus Compact and LetterPerfect

Even Mac Classic and PowerBook users need to write, so they need word processors that can fit within their tight memory configurations. Recognizing this, the makers of Nisus and WordPerfect have introduced streamlined versions of their products: Nisus Compact (\$150) and LetterPerfect (\$149), respectively.

Both products jettisoned their big brothers' macro commands; graphics editors; most frame-placement options; and the commands for tables of contents, indexes, and cross-references.

As a result of these omissions, Nisus Compact weighs in as a program that's much smaller but also easier to use than Nisus is. Happily, it retains almost all the positive features that made Nisus unique: multiple levels of undo, an Append to Clipboard command, and rectangular and noncontiguous selection. Although Nisus Compact's find-and-replace is considerably scaled down from Nisus' PowerSearch, it still outdistances most of the competition and is much more accessible. It even adds a Fuzzy Find option for locating text that approximately matches your selection. Nisus Compact also retains, for better or worse, virtually all of Nisus' ruler and style-sheet functions.

Nisus Compact's File Clerk Catalog, for locating and organizing files on your disk, isn't exactly a breeze to use, but it's a great improvement over Nisus' Catalog function. Unfortunately, Nisus Compact does not arrive as a complete package. The spelling checker, thesaurus, and merge functions — all important features — are sold as separate modules.

For PowerBook users, Nisus Compact can run completely from RAM, conserving battery life. Overall, Nisus Compact is an attractive product.

LetterPerfect (which was still unreleased as we approached deadline) is a scaled-down version of WordPerfect. Although LetterPerfect is a very serviceable word processor, scaling down meant losing WordPerfect's greatest strength: its page-layout features. Not only is the graphics editor gone but so are the border and shading options, text sidebars, figure captions, and most of the specialized commands for frame placement. LetterPerfect has also abandoned style sheets. It does retain several of WordPerfect's better features, however, including its flexible column-formatting and find-and-replace options. And, unlike Nisus Compact, LetterPerfect comes as a complete package.

Before you run out to buy either of these programs, however, consider WriteNow 3.0. In terms of disk space and memory requirements, WriteNow is the most compact of any Mac word processor.

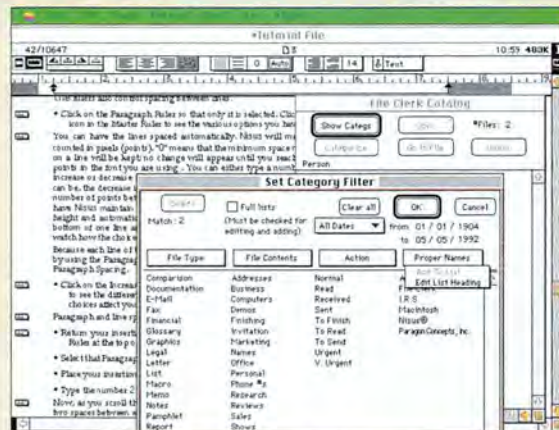


Figure B: Nisus Compact's File Clerk Catalog, not available in Nisus, helps you keep track of your files. With Nisus Compact, you can assign categories to each Nisus-readable file on your disk. You can then use File Clerk to filter the files list, displaying just those files that match your selection criteria.

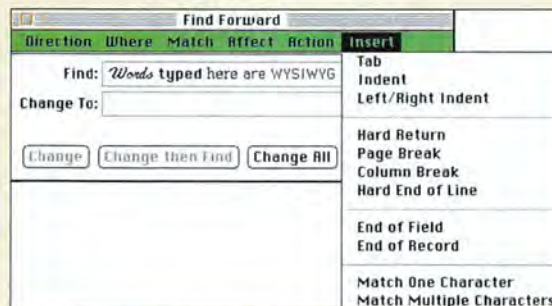


Figure C: LetterPerfect lacks the style sheets, macros, graphics, and page-layout features of its big brother, WordPerfect, but its Find/Change dialog box retains the complete set of options found in WordPerfect.

long documents and are no longer restricted to high-end applications. Every program we reviewed except MacWrite II includes some sort of style-sheet option.

Typically, defining a style means giving a name to the format settings (the font, ruler settings, and so on) in a paragraph. Once you've defined a style, you can directly apply all of its settings to any other paragraph by selecting the style's name. The distinguishing characteristic of style sheets is that when you modify a style definition, the program updates all text previously assigned that style to reflect the change. This not only saves time but also makes it much easier to maintain a consistent format throughout a long document.

A word processor's ability to create tables of contents, indexes, and cross-references, complete with automated updating of page numbering, is another important concern

if you work on long documents. For example, if your text includes a cross-reference such as "See Figure 3 on page 18," you need a program that updates the page number whenever an editing change moves Figure 3 to another page. Having this ability in your word processor is not crucial if you export your documents to a page-layout program, however.

How They Stack Up. It's in the long-document category that the difference between the high-end programs and the midlevel ones is clear. None of the midlevel programs even make it to the starting gate here.

Word's style sheets are exceptionally easy to learn and use. You can access styles from a pop-up menu on the ruler. Whenever you select a defined style for a paragraph, Word conveniently lets you choose whether to change the paragraph formatting to match the style or whether to

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redefine the style to match the paragraph.

WordPerfect's style sheets require more effort to master, and using them isn't always straightforward: Sometimes you have to plow through as many as three separate dialog boxes, each with numerous and often unclear choices. However, WordPerfect is the only program that permits user-entered text to be part of a style definition. This can be useful, for example, if you want to have your paragraphs always begin with the same phrase or label.

Nisus has two style functions. The first, user-named rulers, is much like Word's styles feature, except that it doesn't have character-formatting options. The second, the Styles menu command, lets you combine character and paragraph formatting. There is actually another set of rules governing how unnamed rulers work. With all these options, even experienced users can get confused. In the case of Nisus' style functions, as with many of its other features, we appreciated its capabilities much more than its implementation of them.

Being able to generate a table of contents automatically is important when you're working on long documents. Among the high-level programs, Word has the easiest method (relatively speaking!) for creating a table of contents. In most word processors, you identify items to be included in a table of contents by marking them with hidden text code. Word can bypass this requirement by building a table of contents directly from your outline headings.

For indexing, the situation is more muddled, with no program consistently better than all the others. Word is best for creating nested index listings and for applying style formats to indexes. Both Nisus and WordPerfect are better than Word at indexing terms that span several pages or that subsume different categories. Nisus has the fastest method for indexing all occurrences of a word; it uses a special PowerSearch function to index any word you enter in the Search dialog box. WordPerfect is the only program that can generate an index based on a list of words in a separate document. Both WordPerfect and Nisus do cross-referencing, a feature that is altogether absent from Word.

Surprisingly, Word is the only program with section-division and document-linking functions. As mentioned previously, Word is the only application that lets you have separate page-numbering sequences within the same document. It is also the only program that can produce a single index from several separate but linked documents.

Although not a high-end application, WriteNow deserves special mention for having the most-clearly designed and functional style sheets (see Figure 5). It has paragraph- and character-level styles and employs a logical sequence of style "layers" that makes it easy to predict the effects of any style override or redefinition. Clearly, T/Maker has benefited from seeing where the others have stumbled.

Page Layout: Expanded Processing

If you're serious about page layout, use a page-layout program, such as PageMaker or QuarkXPress. Not even the best word processor can substitute for one of these applications. Still, if you need layout capabilities only occasionally, such as for an in-house newsletter, it's convenient and economical to use your word processor to do the job.

Probably the most critical layout feature is frame placement, which is the ability to position separate graphic

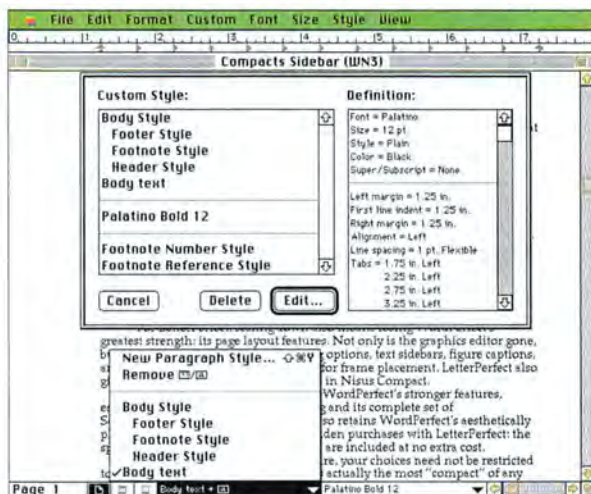


Figure 5: WriteNow 3.0 features a thoughtfully designed system for style sheets that allows paragraph- as well as character-based styles. The system includes separate pop-up menus along the bottom border, and WriteNow adds icon symbols after a style's name to indicate the presence of any selective formatting that overrides a style definition.

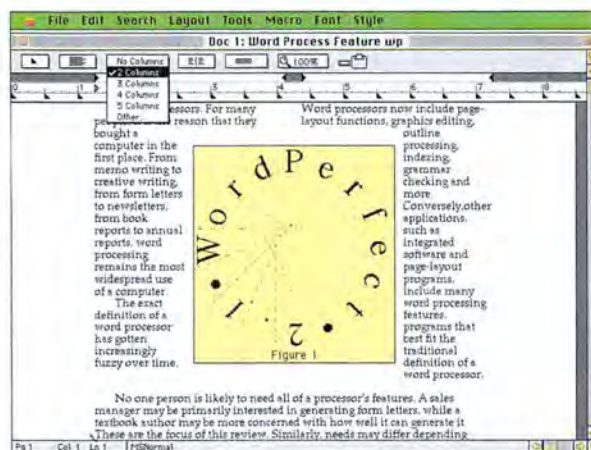


Figure 6: WordPerfect's excellent page-layout features let you shift from a one-column to a two-column format within the same page. It's easy to place a graphic frame, complete with border, shading, figure caption, and text runaround. The circular text was created with one of WordPerfect's many prerecorded macros.

Table 2: Features of Word Processors

◆ = poor						
◆◆ = average						
◆◆◆ = above average						
	MacWrite II	Nisus	Taste	Word	WordPerfect	WriteNow
Short documents						
Ease of use	◆◆◆	◆	◆◆◆	◆◆	◆◆	◆◆
Ruler	◆◆◆	◆	◆◆	◆◆◆	◆◆◆	◆
Spelling checker	◆◆	◆◆	◆◆	◆◆	◆◆◆	◆
Thesaurus	◆◆	◆◆	◆◆	◆	◆	◆
Pasting graphics	◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆
Medium documents						
Headers and footers	◆	◆◆	◆◆	◆◆◆	◆◆	◆
Find-and-replace	◆◆	◆◆◆	◆◆	◆◆◆	◆◆◆	◆
Tables	none	none	none	◆◆◆	◆	none
Outlining	none	◆	none	◆◆◆	◆	none
Glossary	none	◆◆◆	none	◆◆	none	none
Footnotes/endnotes	◆◆	◆◆◆	◆◆	◆◆◆	◆◆	◆
Long documents						
Style sheets	none	◆	◆◆	◆◆◆	◆◆	◆◆◆
Table of contents	none	◆	none	◆◆◆	◆◆	none
Indexing	none	◆◆◆	none	◆◆	◆◆◆	none
Section divisions	none	none	none	◆◆◆	none	none
Document linking	none	none	none	◆◆◆	none	none
Page layout						
Frame/sidebar placement	none	◆◆	◆◆◆	◆	◆◆◆	none
Graphics editing	none	◆◆◆	◆◆◆	◆	◆◆◆	none
File importing (text and graphics)	◆◆	◆◆	◆◆	none	◆◆◆	◆◆◆
Column formatting	◆	◆	◆◆	◆◆◆	◆◆◆	◆
Lines, borders, and shading	none	◆	◆◆◆	◆◆	◆◆◆	◆
Merge documents						
Form letters	◆◆◆	◆◆	◆◆◆	◆◆◆	◆	◆◆
Labels	none	◆	◆◆◆	◆◆	◆	◆◆
Stationery documents	◆◆	◆◆	◆◆◆	◆◆	◆◆	◆
Find File or Catalog command	none	◆	none	◆◆◆	◆	none

objects or text sidebars within the main text and have the text run around the frame. For example, by using a frame, you can easily flow text around a picture.

Another key feature is the program's general handling of graphics. For page layout, you need much more than just the ability to paste pictures. You should also be able to edit graphics and directly import different graphic formats such as TIFF and EPS.

Column formatting is another essential ingredient if you're laying out a newsletter or similar document. All six programs can display text in columns, but with very different degrees of flexibility.

Some of the other layout features available, such as shading and borders for frames or paragraphs, can benefit almost any document.

How They Stack Up. Both Taste and WordPerfect let

you place graphic or text frames anywhere on a page and have the main body text run around the borders of the frame. They also let you place frames either in front of or behind the text, although only Taste lets you easily shift a frame from one layer to another. With Taste, you can even run text inside the borders of a graphic frame. Both programs let you anchor a frame to either a specific paragraph or a specific location on the page. WordPerfect is the only program that can link figure captions to a frame and automatically sequence figure-caption numbers (see Figure 6). Overall, WordPerfect surpasses Taste largely because of its greater placement precision, but Taste is generally easier to use.

These two programs also have separate 8-bit-color MacDraw-like graphics layers for creating and editing graphics. We preferred Taste's approach of a transparent

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graphics layer that overlays the text to WordPerfect's separate graphics-editor window.

Although Word can theoretically match most of the features of these other two programs, it loses points, because its procedure for placing frames is nearly impossible to master. Proper placement of a frame, if you are lucky enough to achieve it, requires several shifts back and forth among three views of the document (Normal, Page Layout, and Print Preview) and the use of two commands from the Frame menu. Also, although Word 5.0 includes a graphics editor, it has a bare minimum of tools and supports only eight colors. Finally, when you're working with page layout in Word, you may run into some minor but annoying screen-redraw problems.

Taste, Word, and WordPerfect all let you vary the number of columns in different parts of a document, but only Word and WordPerfect allow different column formatting on the same page. Only WordPerfect lets you set unequal column widths.

When it comes to page layout, Nisus is a second-string player. It has a transparent graphics layer, with flexible frame-placement options, and a set of graphic editing tools. However, it falls behind the others because its borders can be set only for a whole page, not for specific paragraphs or objects. Also, you're limited to having the same number of columns throughout a document. Finally, its graphics-importing options are weaker than those of the other contenders here; for example, Nisus can't directly import TIFF documents.

MacWrite II and WriteNow have no frame-placement features and no graphics-editing tools. Graphics can be pasted in only through the Clipboard as characters in a line of text, which prevents independent movement of the frame and precludes any sort of text runaround.

For adding shadings and borders, Taste and WordPerfect again top the list.

Merge Documents: Form Letters

A word processor can automate the task of producing multiple variations of a form letter so you can personalize your message without re-creating the document for every recipient.

The single essential feature here is a Merge command, which lets you combine two files. One is a letter template into which you've inserted special merge codes, and the other comprises the data, typically an address list, to be merged with the letter. When you execute the Merge command, the program creates a series of letters, each customized for a different addressee.

More-specialized merge options include conditional commands (used, for example, to include a request for payment only if the amount owed is greater than zero), a method for printing multiple records on the same page (useful for printing addresses on label sheets), and a means of setting selection criteria (necessary if, for instance, you want to send letters only to people who live in a particular city). Another specialized merge option lets you set the program to pause for and request user input. This can be applied to tasks other than form letters, such as automating prompts for filling out an application.

Other potentially useful features for writers of form letters include a Find File or Catalog command, for locating specific letters from among a large library of files on-disk, and stationery documents, which allow you to save modifications to a template without the risk of altering the original document.

How They Stack Up. In the merge-documents category, Word tops the list by combining ease of use with an extensive range of features. With its new Print Merge Helper, you can insert merge codes simply by clicking on the correct code name from a convenient pop-up menu — no typing or memorization is required. Word can handle any and all of the specialized merge tasks cited above,

Table 3: Word Processors

	MacWrite II 1.1 v3 ***	Nisus 3.06 ***	Taste 1.02c ***½
List price	\$129	\$395	\$149
Pros	Easiest to use. Handles merges well. Interactive spelling checker.	Great find-and-replace. Excellent copy-and-paste. Good indexing and glossary features.	Very good graphics and page-layout functions. Excellent merge.
Cons	Weak graphics and page-layout functions. No style sheets or multiple headers and footers.	Difficult to use. Too dependent on macros for commonly needed features.	Slow performance for graphics. No tables. Confusing style-sheet commands.
Company	Clarix Corp. 5201 Patrick Henry Dr. Santa Clara, CA 95052 408-727-8227	Nisus Software, Inc. 107 S. Cedros Ave. Solana Beach, CA 92075 619-481-1477 619-481-6154 (fax)	DeltaPoint, Inc. 2 Harris Ct., Ste. B-1 Monterey, CA 94041 408-648-4000 408-648-4020 (fax)



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Word-Processing Programs

from conditional merges to pausing for user responses.

Still, for simpler merge tasks, Taste and MacWrite II work as well as Word and are even easier to use. Like Word, both Taste and MacWrite II use point-and-click methods that let you enter merge codes easily. Taste also has a built-in address-book database and the simplest methods for printing labels and setting selection criteria. Taste's major omission is its lack of conditional commands. MacWrite II does include conditional commands, but it has no options for setting selection criteria or creating labels.

Nisus and WriteNow both have powerful instruction sets (WriteNow is virtually identical to Word in this regard), but both programs lose points in ease of use because they require that you manually type all merge codes and delimiters.

WordPerfect requires its own specially formatted codes, even in the data files. Thus, unlike the other programs, it cannot directly use tab-delimited text imported from a database. It also has no conditional commands, a surprising oversight for a high-end application.

Nisus, Word, and WordPerfect all have a cataloging feature that facilitates locating files, including an ability to search the text within a document without having to open it. Overall, Word's cataloging feature is by far the most convenient to use.

The Bottom Line

If your use of a word processor spans several of these categories, the best all-around choice has to be Microsoft Word. In many areas, such as creating tables, outlines, and merges, it clearly outdistances the competition. And in those areas in which Word isn't at the top, it is almost always near it.


That isn't to say that using Word is a constant joy — far from it. Despite version 5.0's new ease-of-use features,

Word is still in need of an interface overhaul. Particularly frustrating are its dependence on multiple views and its handling of frame placement. Furthermore, Word's anemic graphics editor isn't worth bothering with. And just by looking at its densely packed 830-page users' guide, you can tell that this is not the easiest program to learn to use.

Among the other high-end applications, WordPerfect is the preferred choice if page-layout functions are high on your priority list. Nisus, with unique features such as multiple Clipboards and PowerSearch, offers much to admire, but it has too many weak areas and too steep a learning curve for us to be able to justify giving it any overall recommendation.

If you don't need a high-level application, we recommend MacWrite II, largely because of its unsurpassed ease of use. However, if you frequently work with graphics, go with Taste. Both packages handle short to medium documents capably and have a strong set of merge features. Consider WriteNow only if you expect to make heavy use of style sheets.

But before you purchase a midlevel word processor, take a look at integrated packages such as ClarisWorks and GreatWorks (see "Swiss-Army Software," June '92, Buyer's Guide page 44). If its word-processing module meets your needs, an integrated package can be a great bargain.

Eventually, you may really need two word processors. Word 5.0 may be fine on a desktop machine, but it's too big and disk-intensive for a PowerBook, where WriteNow's compactness wins. So your ultimate decision may be to choose the best pair of programs. 

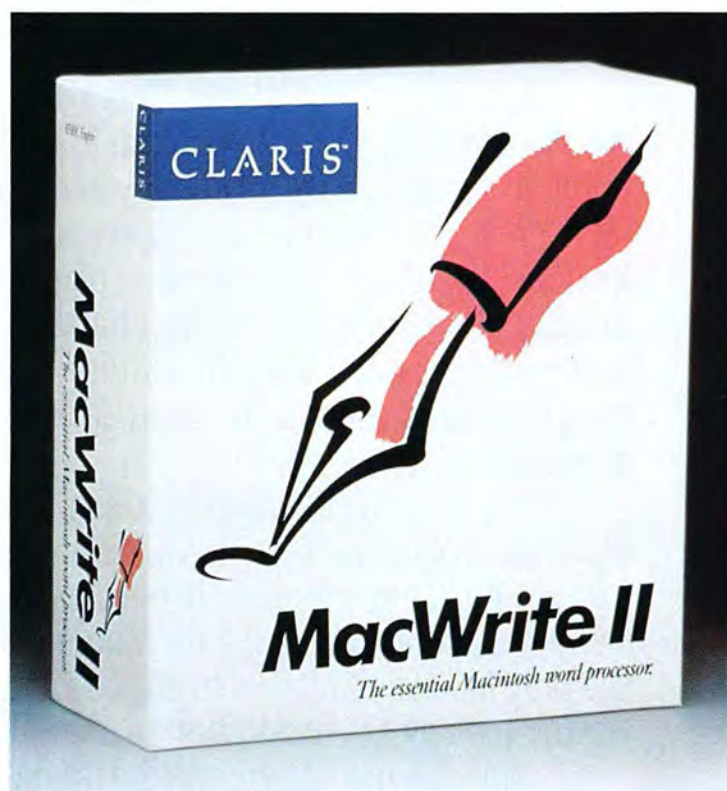
Ted Landau is a *MacUser* contributing editor and a professor of psychology at Oakland University, in Rochester, Michigan. He is currently working on a book on Macintosh problem solving.

Table 3: Word Processors, continued

	Word 5.0 ★★★★	WordPerfect 2.1 ★★★★½	WriteNow 3.0 ★★★★
List price	\$495	\$495	\$249
Pros	Superior outlining. Superior tables and merge functions. Excellent style sheets. Excellent section divisions.	Superior page-layout functions. Full-featured graphics editor.	Superbly designed style sheets. Speedy and compact.
Cons	Poor frame-placement functions. Weak graphics editor. Too many views.	Awkward style sheets. Inconvenient mail-merge operations. No glossary.	Weak graphics and page-layout functions. No searching attributes. No endnotes.
Company	Microsoft Corp. One Microsoft Way Redmond, WA 98052 206-882-8080	WordPerfect Corp. 1555 N. Technology Way Orem, UT 84057 801-222-5800	T/Maker Co. 1390 Villa St. Mountain View, CA 94041 415-962-0195 415-962-0201 (fax)

\$129.

Write on.



Where is it written that a great word processor has to be an expensive word processor? MacWrite® II, in fact, has just rewritten that story. Now it costs only \$129.

A remarkable price for the word processor favored by over one million users worldwide. Everyone agrees that MacWrite II is as simple and straightforward as a well-written sentence. With a rich feature set that's equally accessible. So it's the only word processor you'll ever need.

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Simply powerful software.™

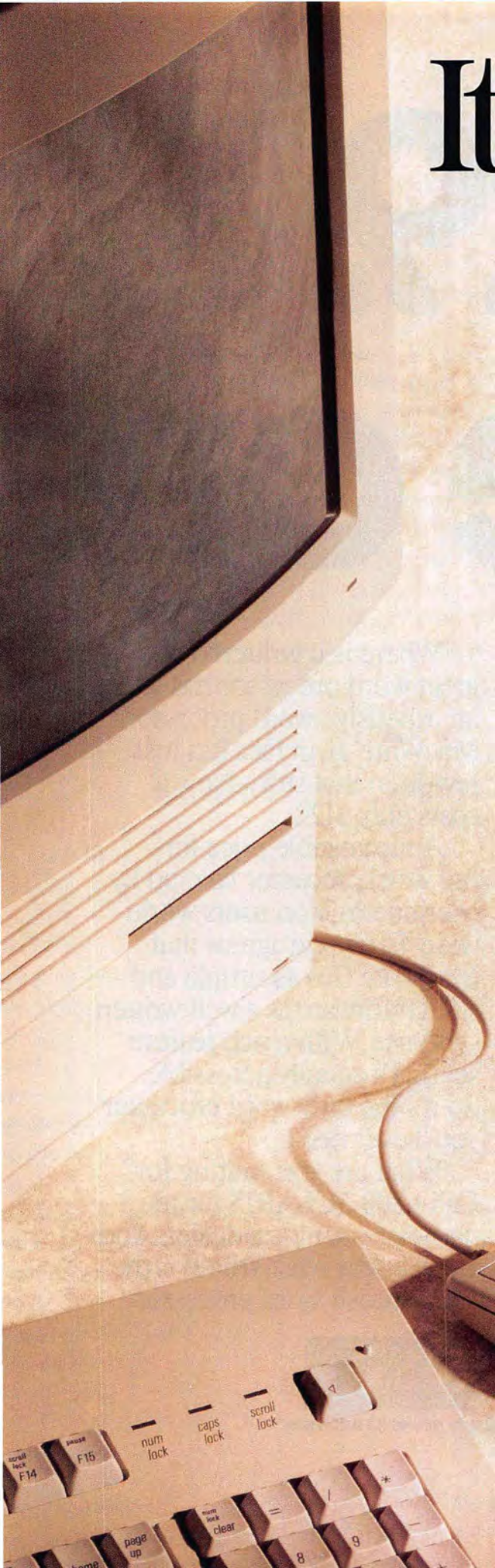
It'll remind you of a Macintosh

One look at this Lotus® spreadsheet, and it will all come back to you. All those feelings of power and control that surfaced when you first sat down in front of a Mac®.

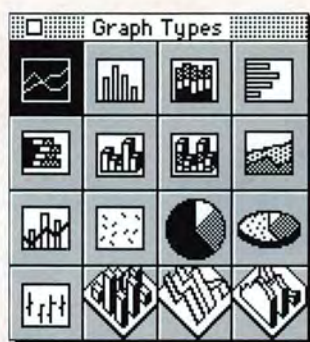
You see, this isn't just another version of Lotus 1-2-3®. It's a spreadsheet that really grabs hold of the full computing power of Macintosh®. So everything you've come to love about Mac computing is now available in 1-2-3.

Take our graphing tools. They're as easy to use as the Mac itself. With just a point and a click of your mouse, you can preview, create and change all graphs. And the icon palette offers you every type of graph imaginable—3D pie charts, bar charts, area and scatter graphs—literally hundreds of variations are available to you in an array of colors.

You probably first bought your Macintosh because it would make life easier for you. You'll buy this spreadsheet for the same reason. You see, 1-2-3 for Macintosh is the only Mac spreadsheet to provide true 3D technology. So, in addition to file linking, you can use 3D to consolidate data or create multi-page reports all in a single worksheet file.



u of why you bought in the first place.

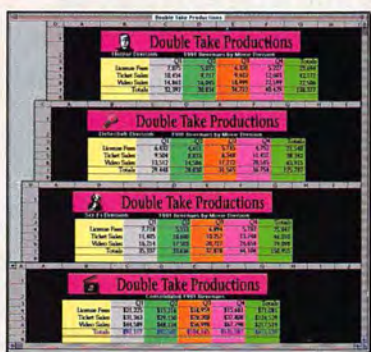


A tear-off palette full of 3D pie, bar, area and scatter graphs will help you make the numbers look good.

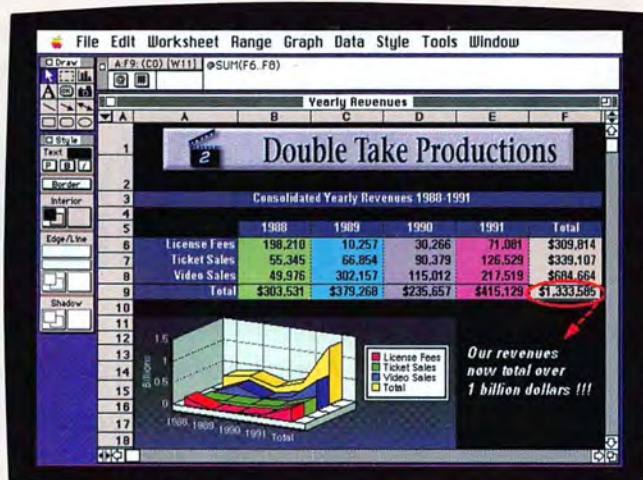
You can view and work with up to 256 worksheets simultaneously. In short, 3D makes the job of analyzing and consolidating a snap. And after using it, you'll wonder how you got along so long without it.

1-2-3 for Macintosh also offers in-cell editing, a feature that lets you edit text, formulas and data directly in the cell. So you can focus on the worksheet, instead of the formula bar above. Makes sense, doesn't it?

Because the program captures the true spirit of Macintosh, it has recently earned the Editor's Choice Award from Computer Reseller News as well as praise from Apple Chairman and

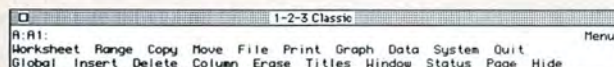


Our unique 3D technology lets you view and work with up to 256 worksheets in a single file and create multi-page reports.



Because 1-2-3 for Macintosh was designed just for the Mac, you'll feel right at home with its menus, tools and entire working environment.

CEO John Sculley, who has called it, "a spectacular product."* (He doesn't throw comments like that around every day.)



One press of the slash key brings up the 1-2-3 Classic® menu—welcome news to DOS users. The program is also compatible with other versions of 1-2-3, regardless of platform.

So pick up a copy of 1-2-3 for Macintosh from your favorite dealer. Or call **1-800-TRADEUP, ext. 6683** for a free working model. (Excel users, be sure to ask about our special upgrade price.) 1-2-3 for Macintosh. It'll bring back fond memories.

Lotus 1-2-3 for Macintosh

Come see us at MacWorld, Boston, Booth #5626.

*Boston Globe 6/4/91. **There is a \$5.00 fulfillment/handling charge when ordering the working model direct from Lotus. Please have your credit card and product package ready when you call. In Canada, call 1-800-GO-LOTUS. ATM ©1992 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Classic is a registered trademark licensed to Lotus Development Corporation. Macintosh and Mac are registered trademarks of Apple Computer, Inc. The Apple logo is a registered trademark of Apple Computer, Inc., used under license. This product includes Adobe Type Manager. Adobe Type Manager and the ATM logo are registered trademarks in the United States, of Adobe Systems, Incorporated.

The Third Dimension

*Four hundred years later, it's time to go beyond perspective:
3-D graphics on the desktop are here.*

BY DAVID BIEDNY

Ever since the 16th century, when painters started using perspective, graphic artists have struggled to cram our three-dimensional world into a flat, two-dimensional space — whether that space was a canvas or a color monitor. Artists have always longed for a way to stick their hands into their work to create and manipulate a realistic, three-dimensional world, but until recently that capability has been beyond their grasp. The arrival of 3-D-graphics applications, however, has finally given them the tools they need.

The 3-D products reviewed here are primarily visualization tools intended for illustration and animation, not the numerical accuracy that's required in CAD software, for instance. (CAD software offers the precision needed for manufacturing, but in contrast to 3-D-graphics applications, CAD packages tend to have more-limited rendering and animation capabilities.)

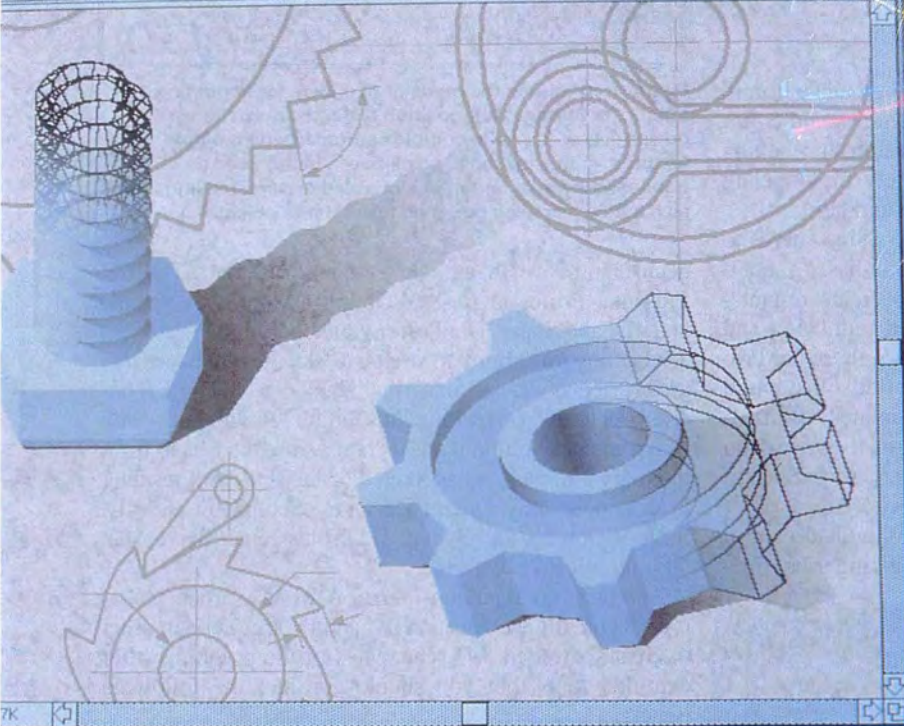
The 3-D-Program Market

The interest in Mac 3-D visualization software is much more intense than you might imagine — at least judging by the plethora of 3-D programs available. We've divided the potential market into beginning, intermediate, and advanced users (see Table 1).

You need at least a Macintosh II-class machine to do any serious 3-D modeling and rendering. Generally, Quadras are the machines of choice, because you want the fastest machine you can get.

File Edit Model Render Animation Windows

Fastener Rendering



3-D Programs

Going to Work

Typical 3-D creative sessions can be broken down into three separate stages:

- Modeling: creating the basic shapes, or skeletons, of 3-D objects.
- Rendering: specifying surface attributes and textures, lighting, and camera attributes.
- Animation: adding motion to objects and lights in order to create a sequence of moving images.

Not all programs offer a full set of modeling, rendering, and animation features, and price point does not really play a role in the equation. Table 2 outlines the various programs' capabilities.

Modeling: Making the World

All the programs that include modeling enable you to create basic primitive shapes (cubes, spheres, and cylinders) and use basic tools such as extrusion and lathing tools to modify the shapes, but a variety of modeling features differentiates one modeler from another:

- Spline-based tools: the ability to use spline curves to create smooth, flowing geometries. Spline-based modeling dramatically extends the ability to create organic-looking shapes, at the cost of increased redrawing and rendering time. Alias Sketch!, MacTOPAS, Presenter Professional, and Ray Dream Designer all offer spline-based tools. NURBS (nonuniform rational B-splines) is an advanced derivative of spline-based modeling that gives you exquisite control over shape characteristics. Alias Sketch! currently is the only program with true NURBS.
- Vertex editing: the ability to grab individual control points, or vertices, and reposition them, giving users fine-

Future Dimensions

Several of the packages we looked at were due to get major upgrades soon, most of which should be available by the time you read this.

Infini-D 2.0, for example, introduces alpha-channel support, QuickTime-movie texture maps, and significantly enhanced rendering speed and quality in all rendering modes. It will also be the first Mac 3-D program to offer EPS outline-subscribe capabilities: When you edit an original 2-D EPS outline, Infini-D 2.0 automatically updates the extruded object based on that modified outline.

The long-awaited ElectricImage Animation System 1.5 includes shadow casting; a dramatically improved animation interface and tool set; transparency and environment mapping; and totally rewritten, meatier documentation in a list of 150 feature additions and changes.

MacroModel, a new generation of Swivel 3D, will sport a variety of new spline-based-modeling tools as well as an advanced vertex-editing mode and improved lighting options. It's not yet clear whether MacroModel will replace Swivel 3D Professional. Unfortunately, MacroModel won't have texture-mapping abilities, but reportedly it will include and improve upon the RIB-output abilities of SwivelMan.

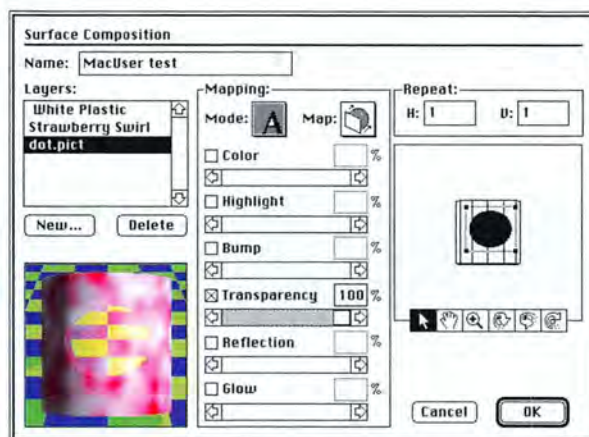


Figure 1: Infini-D is the modeler of choice for beginning 3-D artists. Its Surface Composition dialog box provides a powerful way to create complex surfaces with multiple textures. In this example, an ellipse is being used as a transparency map on top of a marbled texture, making it look as if a hole has been punched through the object.

detail control over their models. Alias Sketch!, MacTOPAS, Presenter Professional, Ray Dream Designer, Sculpt 3D and 4D, and Super3D all offer vertex editing.

- Lofting: the ability to stretch a "skin" over shapes that are in effect cross-sectional ribs. Think of a boat hull: It has cross-sectional ribs along the length of the hull, with fiberglass or aluminum sheets laid across the ribs to form the main hull wall. Alias Sketch!, MacTOPAS, Presenter Professional, Ray Dream Designer, Sculpt 3D and 4D, StrataVision 3d, and Swivel 3D Professional/SwivelMan all offer a form of lofting.

Another important consideration for Mac artists is 3-D type. Typically, you need ATM and/or TrueType in order to create extruded 3-D type. Most of the programs offer extruded fonts, but you should consider the following issues:

- Infini-D and MacroMind Three-D can extrude only TrueType fonts, which is a hassle for artists with large libraries of PostScript fonts. Although several commercial utilities let you convert PostScript to TrueType, it would be easier if these programs simply supported ATM.
- Presenter Professional, Ray Dream Designer, Showplace, and StrataVision 3d all give you some way of beveling the edges of extruded text. Mr. Font, a separate application in the ElectricImage package, is unique in that it automatically creates the bevels as a separate object, letting you easily specify different texture and surface attributes for the bevels (extruded type with a shiny beveled edge and matte-finished front and back faces is a common television effect).

The final things to take into consideration are input and output formats. Every program (except for Showplace, which uses RIB [RenderMan Interface Bytestream] as its native format) has a custom file format for its models and



Figure 2: Like *Infini-D*, *Ray Dream Designer* is an all-in-one package that's well suited for beginners. It includes a great selection of fully editable built-in procedural textures. Because these are procedural textures and not surface maps, you can apply them all the way "through" an object.

scenes, but many programs import and export DXF as well. However, DXF often presents interapplication compatibility problems and inconsistencies that make it somewhat flawed as a universal standard. We found the Transporter utility, which ships with *ElectricImage*, to be the most powerful file-format converter available for the Mac.

Rendering: Making It Real

The rendering process is the most computationally intensive part of 3-D work and one of the most important, because it delivers the final product. Most of the packages we reviewed offer the following types of rendering: wireframe, hidden-surface, Z-Buffer (most basic shaded view), Gouraud (basic smoothing and shading), and Phong (shadows, environmental reflections, basic transparency, and textures).

Another type of rendering called ray tracing simulates light bouncing around a room, complete with interobject reflections; refractivity; and better shadows, transparency, and lighting effects. *Alias Sketch!*, *Infini-D*, *Presenter Professional*, *Ray Dream Designer*, *Sculpt 3D* and *4D*, *Showplace/MacRenderMan*, and *StrataVision 3d* all offer ray tracing.

StrataVision 3d provides a unique rendering mode, Raydiosity, which is similar to Radiosity, a technique developed at Cornell University that takes into account the conservation of light energy in a scene. With either scheme, colors "bleed" from objects onto other objects, resulting in an uncanny and seductive realism. The Cornell technique and *StrataVision*'s Raydiosity are both ravenous CPU vampires, so even simple scenes can take *weeks* to render on the fastest Macs.

One of the more important but often forgotten features to look for in 3-D software is the ability to generate an alpha channel, a mask that isolates the foreground objects from the background. You use the mask to combine, or composite, multiple rendered 3-D objects into a single scene. With this technique, you can simulate shadows and reflections without greatly increasing the rendering time. Alpha channels are also crucial for cleanly integrating 3-D computer animation with live-action surroundings. *ElectricImage*, *MacroMind Three-D*, *MacTOPAS*, *Presenter Professional*, *Ray Dream Designer*, and *Showplace* can all generate alpha channels.

Animation: Making It Move

Although people tend to envision flying logos when thinking about animation, you actually have animation even if only part of an image changes over time. The easiest way to create an animation is to set "keyframes" and use software to create the in-between frames (tweening) that fill in the action between keyframes.

Although all the programs that support animation let

Table 1: The 3-D-Program Market

	Product Price Range	Tasks	Products
Beginning users	up to \$1,000	Desktop publishing. General graphics. Presentations.	<i>Infini-D</i> <i>Ray Dream Designer</i> <i>Showplace/MacRenderMan</i> <i>StrataVision 3d</i> <i>Super3D</i> <i>Swivel 3D Professional/SwivelMan</i>
Intermediate users	\$1,000 to \$2,500	Advanced presentations. Industrial design. Package design.	<i>Alias Sketch!</i> <i>MacroMind Three-D</i> <i>Presenter Professional</i>
Advanced users	\$2,500 and up	Advanced industrial engineering. Broadcast animation. Engineering.	<i>ElectricImage Animation System</i> <i>MacTOPAS</i> <i>Presenter Professional</i> <i>Sculpt 3D</i> <i>Sculpt 4D</i>

3-D Programs

you move objects around on the screen, this is only the beginning of creating an animation. The most desirable scenario is one in which you can modify any parameter of any element over time. For example, you might want to have a stationary object with an animated light source. MacroMind Three-D has the best animation interface, an extension of the VideoWorks/Director Score metaphor.

Another form of animation is "morphing," which lets you change the basic geometry of an image, or 3-D model, over time — metamorphosing a car into a dolphin, for example. Typically, if you want to morph one model into another, the beginning and-ending objects must have exactly the same number of vertex points. Only one Mac program, Infini-D, supports true morphing, which lets you morph between two totally different objects. Morph animation can be somewhat unpredictable, however.

Beginning Users: General Graphics

Users getting started in 3-D often find themselves involved in general desktop-publishing tasks and perhaps multimedia. For them, the all-in-one packages are ideal.

Infini-D. Infini-D offers the most balanced set of features for beginning and intermediate users. The general interface, with some minor exceptions, is a study in clarity and interactivity. The object floater displays the current status of any selected object, including position and scaling and size data. As you change an object's attributes with the interactive tools, the object floater instantly updates



Figure 3: StrataVision 3d's rendering quality is excellent, but StrataVision is the slowest renderer of any of the packages we tested. A typical StrataVision working session is shown here. Note that the spotlights are displayed in the actual color assigned to each light, which produces the colored shadows in the rendered window at the right.

and displays the new object statistics. But although the modeling portion of the program includes some neat goodies, such as the Terrain Tool, Infini-D's lack of spline and lofting tools may frustrate advanced artists.

Infini-D comes with an excellent selection of procedural textures, however, along with an enormous preprogrammed texture library. Unlike surface maps, procedural textures

Table 2: Features of 3-D Programs

	Alias Sketch!	ElectricImage Animation System	Infini-D	MacroMind Three-D
General				
Ease of use	♦♦	♦♦	♦♦♦	♦♦♦
Documentation	♦♦	♦	♦♦	♦♦
Price/performance	♦♦	♦♦♦	♦♦♦	♦♦
Modeling				
Potential object complexity	♦♦♦	NA	♦♦	NA
File-format import/export	♦	♦♦♦	♦	♦♦
Font extrusion and beveling	NA	♦♦♦	♦*	♦*
Vertex editing	♦♦♦	NA	NA	NA
Rendering				
Effects-maps positioning and options	♦	♦♦♦	♦♦♦	♦♦
Rendering speed	♦	♦♦♦	♦♦	♦♦
Rendering quality	♦♦	♦♦♦	♦♦	♦♦
Rendering-acceleration options	NA	♦♦	♦♦	NA
Animation				
Morphing	NA	♦	♦♦♦	♦♦
Keyframe control	NA	♦♦	♦♦	♦♦♦
QuickTime support	NA	NA	♦♦♦	NA

* TrueType only.

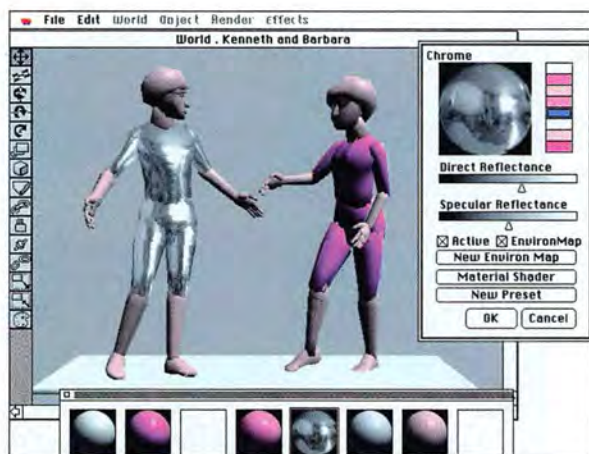


Figure 4: SwivelMan combines Swivel 3D Professional with MacRenderMan so users can take advantage of that program's high-quality rendering functions. The dialog box on the right contains the controls for manipulating the selected texture (which in this case belongs to the left figure's body). The reflective-metal effect is produced by an environment map.

are actual descriptions of a surface, so, for example, a wood procedural texture lets you punch a hole through a "wooden" object and have the grain inside the hole match that on the outside faces. Textures can be animated, and the Surface Composition dialog box (see Figure 1) lets you layer and combine static and procedural texture maps in just about any way. You can scale, rotate, and reposition

any texture, and you can view a sample of the textures mapped onto a selected object.

Infini-D's animation interface is better than Strata-Vision's but not nearly as good as the one in MacroMind Three-D. Infini-D is unique in its ability to morph between two entirely different objects with different numbers of vertex points as well as between two textures (the texture morph is really more of a cross-fade between the beginning and ending textures). A minor but frustrating problem is the program's swapping of the *z* and *y* axes: Instead of representing depth, the labeled *z* axis represents width, a convention not found in any other 3-D program. Also, the rendering speed and rendering quality of objects (especially straight edges) and texture maps leave something to be desired. Although you can choose to render a rectangular selection of any image in order to see the effects of your settings without rendering the entire image, this feature works only with the ray-tracing mode instead of with all rendering modes.

Ray Dream Designer. Ray Dream Designer is a relatively powerful renderer — it's one of the faster ray tracers, offers great rendering quality, and has wonderful procedural textures (see Figure 2). Ray Dream is especially attractive to print designers, because of its ability to render at very high resolutions. The program's modeling abilities include a lofting-extrusion mode and text extrusion along variable paths. There's also a fast, shaded-preview window, which is extremely useful for viewing

Table 2: Features of 3-D Programs, continued

	MacTOPAS	Presenter Professional	Ray Dream Designer	Sculpt 3D and 4D
♦ = poor ♦♦ = average ♦♦♦ = above average				
General				
Ease of use	♦♦	♦♦	♦♦	♦
Documentation	♦♦	♦♦	♦♦	♦
Price/performance	♦	♦♦♦	♦♦♦	♦♦
Modeling				
Potential object complexity	♦♦♦	♦♦♦	♦♦	♦♦♦
File-format import/export	♦♦	♦♦♦	♦♦	♦♦♦
Font extrusion and beveling	♦	♦♦	♦♦♦	NA
Vertex editing	♦♦♦	♦♦♦	♦♦	♦♦♦
Rendering				
Effects-maps positioning and options	♦♦	♦♦♦	♦♦	♦♦♦
Rendering speed	♦	♦♦	♦♦♦	♦♦
Rendering quality	♦♦	♦♦♦	♦♦♦	♦♦♦
Rendering-acceleration options	NA	♦♦	♦♦	♦♦
Animation				
Morphing	♦	NA	♦♦	♦
Keyframe control	♦♦	♦♦	♦♦♦	♦
QuickTime support	NA	♦	NA	NA

3-D Programs

the results of a complex modeling task without fully rendering the object. Ray Dream offers wonderful soft shadows in its ray-tracing rendering mode. The program's modeler, LightForge, offers a great set of fully modular built-in textures plus a "wire texture" shader that combines transparency with a variable horizontal and vertical grid. Although Ray Dream's modeling features will satisfy most beginning-to-intermediate users, the fact that LightForge and SceneBuilder, the program's scene-composition tool, are separate programs is more of a nuisance than a benefit. Users may also find the SceneBuilder interface confusing. Animators will want to look to Infini-D, but print artists should consider Ray Dream Designer.

Showplace/MacRenderMan. A front end for MacRenderMan, Showplace assumes that you are already using an external modeler with the ability to save models in RIB format. Showplace requires MacRenderMan, so unless you already own MacRenderMan or SwivelMan, you'll want the bundle (see the "SwivelMan and Showplace/MacRenderMan" review, August '92, page 58). Showplace is a composition and lighting environment with a highly graphical interface — novices will feel comfortable with it in no time. The program has no modeling or animation tools, and although you would expect a Pixar program to offer a good interface to the complex world of RenderMan shaders, it offers only limited access to shader parameters. The Showplace/MacRenderMan bundle might be more attractive if it were less expensive.

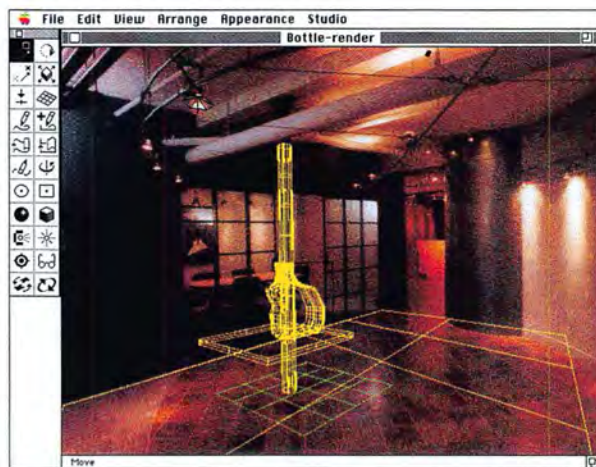


Figure 5: Alias Sketch! may interest those who model curvy objects, but its sluggish performance and unusual interface may offset its spline-based-modeling capabilities. Using a scanned image as a perspective reference, you can reshape the perspective grid (the large yellow grid beneath the object), so the model matches the background more closely.

StrataVision 3d. Although StrataVision 3d offers some of the best rendering quality of all the packages we reviewed, it's unfortunately one of the slowest renderers we tested.

StrataVision offers exquisite, precise control over all surface attributes (see Figure 3) and also uses any 2-D

Table 2: Features of 3-D Programs, continued

◆ = poor ◆◆ = average ◆◆◆ = above average	Showplace/ MacRenderMan	StrataVision 3d	Super3D	Swivel 3D Professional/ SwivelMan
General				
Ease of use	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Documentation	◆◆	◆◆	◆◆	◆◆
Price/performance	◆◆	◆◆◆	◆	◆◆
Modeling				
Potential object complexity	NA	◆◆	◆◆	◆◆
File format import/export	◆	◆	◆	◆◆
Font extrusion and beveling	◆◆◆	◆◆◆	NA	◆
Vertex editing	NA	NA	◆◆	NA
Rendering				
Effects-maps positioning and options	◆◆	◆◆◆	NA	◆
Rendering speed	◆◆	◆	◆	◆◆◆
Rendering quality	◆◆◆	◆◆◆	◆	◆◆
Rendering-acceleration options	◆◆◆	◆◆	NA	NA
Animation				
Morphing	NA	◆◆	NA	NA
Keyframe control	NA	◆	◆	◆
QuickTime support	NA	◆◆◆	NA	NA

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3-D Programs



Figure 6: With its speed and extensive file-import capabilities, ElectricImage Animation System should be the primary choice for professional 3-D animators. Mr. Font, an included application, lets you create a look that should be familiar to TV viewers. (This image, showing shadow casting, was created with a prerelease version of ElectricImage 1.5.)

texture both as an alpha channel for diffusion, transparency, specular, and glows and as the more standard bump and color maps. Adding a texture to a diffusion map lets you create subtle embossing effects. StrataVision also lets you attach alphas to light sources, which makes it effortless to simulate light streaming through a paned window.

The program has a fairly robust tool set, and many of the included modeling tools are stored as external modules, making future expansion a snap. StrataVision is also the only program in our group that includes a Radiosity-based rendering mode. Unfortunately, that mode is so sluggish that it's virtually unusable. Given the program's generally slow rendering speed, you probably won't want to use StrataVision as your main animation generator. For still images, though, StrataVision's general rendering quality is hard to beat.

Super3D. Super3D is a good basic modeler that in many ways feels like a 3-D MacDraw. The program adheres well to the standard Macintosh interface, and CAD/2-D artists will find the transition to 3-D relatively painless. Unfortunately, Super3D lacks advanced modeling tools and quality rendering modes, which limits its overall value.

The big question is whether Aldus will update Super3D in the future. The last update, version 2.5, added MacRenderMan support, with few other improvements, and Aldus seems uninterested in taking the program any further. The modeling and rendering abilities of the program have been surpassed by other packages, and although some novices might want to look at Super3D, we think that most who are just entering the 3-D world would be well advised to look at Infini-D as a starting point.

Swivel 3D Professional. Swivel 3D Professional is the

workhorse of Macintosh modelers. It sports a workable interface and straightforward modeling tools (see Figure 4). The hierarchical object-linking abilities can be constrained in a variety of ways, so Swivel 3D is a good choice for building characters and complex moving models. The program's built-in smooth rendering is lightning-fast and, in many cases, good enough for final images.

Although Swivel 3D also offers basic keyframe animation, you'll want a separate animation and rendering program for professional-quality work. SwivelMan bundles the Swivel 3D Professional and MacRenderMan programs together, but unless you plan to render images with MacRenderMan, there is no reason to choose SwivelMan over Swivel 3D Professional. If you're considering SwivelMan because MacRenderMan is your main renderer, you'll be better served if you spend the extra money on Presenter Professional, which offers much better control of, and compatibility with, MacRenderMan.

Intermediate Users: Multimedia

Although animation isn't the primary goal for intermediate users, it is a part of their work — often within the context of an authoring system such as HyperCard or Director. Package designers, architects, and graphic designers also fall into this group.

Alias Sketch! Alias Sketch! is likely to interest those who want to model smooth, curvy organic images beyond the realm of most of the other modelers reviewed here. The modeling interface is a bit unusual and has an unavoidably steep learning curve. Although the program's main strengths are its NURBS modeling abilities, it does offer decent rendering quality. You can import a scanned background image and interactively match the perspective of a model with the background perspective, an incredibly useful feature that's unique to this program (see Figure 5).

Alas, there are some problems worth noting: The program is sluggish on even the fastest Macs, and it's very difficult to accurately position 2-D texture maps. Although NURBS can be a very powerful modeling method for creating complex objects, it probably won't serve well as the primary modeling paradigm for most users. Alias Sketch! 1.0.2 has fewer bugs than version 1.0, but it isn't totally bug-free. Still, Alias Sketch! might interest those who want an advanced NURBS modeler.

MacroMind Three-D. MacroMind Three-D has the most-powerful animation controls of the programs discussed here. Every detail of every element of a scene can be interpolated over time. The Score interface will be familiar to Director users and is well worth its reasonable learning curve. Although the built-in-rendering quality isn't superb, MacroMind Three-D can use MacRenderMan as a rendering engine (MacroMind Three-D is the only program that offers plug-in rendering engines, but unfortunately, Macromedia hasn't released any alternative, more powerful rendering engines).

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3-D Programs

We did run into problems importing certain models (imported models sometimes mysteriously expanded to fill most of the visible "world") and encountered various bugs and crashes during more-complex rendering tasks. The included FireWorks application — a postprocessing engine for compositing multiple rendered, animated elements; applying limited filters; and dumping the animation to a VTR — was unpredictably problematic.

Presenter Professional. For its price level, Presenter Professional is in a class of its own. It offers a balanced set of modeling tools, decent animation capabilities, and good rendering quality. The interface has a definite learning curve (well worth the effort to master) but is not nearly as complicated as Sculpt's modeling interface. Presenter's Digital Clay feature makes it easy to create nonuniform geometries: When you select a vertex point and pull on it,

Table 3: Pros and Cons of 3-D Programs

	 Pros	 Cons	 Ideal Users
Alias Sketch!	<ul style="list-style-type: none"> • Powerful NURBS modeling. • Matches perspective of scanned background. 	<ul style="list-style-type: none"> • Slow. • Weak texture map positioning. • Performance bugs. 	<ul style="list-style-type: none"> • Industrial designers. • Intermediate to advanced users.
ElectricImage Animation System	<ul style="list-style-type: none"> • Excellent rendering quality. • Fastest software-only rendering speed. • Best font beveling. • Excellent texture-mapping options. • Supports alpha channels. 	<ul style="list-style-type: none"> • Relatively weak animation features. • Expensive. • Very weak documentation. • No shadows. • Hardware-key protection. 	<ul style="list-style-type: none"> • Animation-production studios. • Intermediate to advanced animators. • Intermediate to advanced users.
Infini-D	<ul style="list-style-type: none"> • Intuitive and powerful surface/texture composer. • Large selection of procedural textures. • Nonuniform polymorphic interpolation of models (morphing). • Excellent interface. • Availability of network rendering. 	<ul style="list-style-type: none"> • Mediocre rendering performance. • Mediocre rendering quality. • No true spline-based modeling tools. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Beginning to advanced animators. • Beginning to advanced users.
MacroMind Three-D	<ul style="list-style-type: none"> • Excellent animation interface. • Supports alpha channels. 	<ul style="list-style-type: none"> • Sporadic performance problems. • Sporadic problems importing models. • Buggy compositing program. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Beginning to advanced animators. • Beginning to advanced users.
MacTOPAS	<ul style="list-style-type: none"> • Excellent modeling tools. • Very good rendering quality. • True reflections in Phong mode. • Supports alpha channels. 	<ul style="list-style-type: none"> • Expensive. • Weak animation. • Hardware-key protection. 	<ul style="list-style-type: none"> • Industrial designers. • Intermediate animators. • Intermediate to advanced users.
Presenter Professional	<ul style="list-style-type: none"> • Excellent modeling tools. • Spline-based modeler. • Excellent MacRenderMan support. • Very good rendering quality. • Availability of hardware acceleration. • Supports alpha channels. 	<ul style="list-style-type: none"> • Hardware-key protection. 	<ul style="list-style-type: none"> • Engineers. • Industrial designers. • Intermediate animators. • Intermediate to advanced users.

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3-D Programs




the program automatically warps and stretches connected surfaces. Although the modeler doesn't offer the NURBS power of Alias Sketch!, Presenter Professional is noticeably faster than Sketch! and its tools will satisfy even discerning advanced users.

Presenter Professional has some capabilities that are more closely related to the traditional CAD world. For example, the program can calculate an object's volume

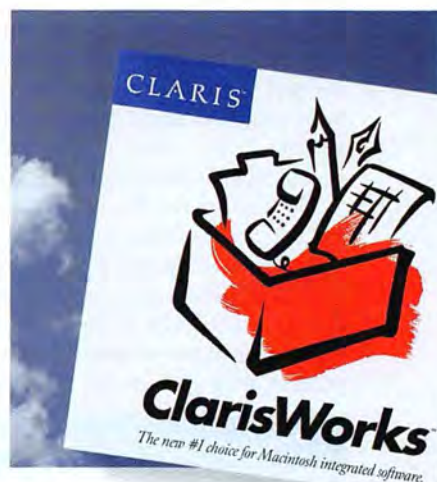
and surface area, which should make it especially attractive to package designers.

Presenter Pro offers the best interface to the MacRenderMan language of any of the packages reviewed here. It provides access to all of a shader's attributes and parameters and produces the most-stable RIB output. This program is a solid performer for intermediate and advanced users.

Table 3: Pros and Cons of 3-D Programs, continued

	 Pros	 Cons	 Ideal Users
Ray Dream Designer	<ul style="list-style-type: none"> • Excellent rendering quality. • Excellent rendering speed. • Availability of network rendering. • Supports alpha channels. 	<ul style="list-style-type: none"> • Weak interface. • Modeler and scene creator are separate applications. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Print artists. • Beginning to advanced users.
Sculpt 3D and 4D	<ul style="list-style-type: none"> • Spline-based modeling tools. • Absolute-vertex and polygonal-face control. • Excellent rendering quality. • Availability of hardware acceleration. 	<ul style="list-style-type: none"> • Difficult interface. • Weak documentation. • Hardware-key protection. 	<ul style="list-style-type: none"> • Industrial designers. • Engineers. • Advanced users.
Showplace/MacRenderMan	<ul style="list-style-type: none"> • Excellent rendering quality. • Highly graphical interface. • Supports alpha channels. • Availability of hardware acceleration. • Availability of network rendering. • Availability of UNIX rendering. 	<ul style="list-style-type: none"> • Requires RIB-geometry files. • Separate application for texture-map and extruded-font generation. • Weak MacRenderMan shader-parameter interface. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Print artists. • Beginning to intermediate users.
StrataVision 3d	<ul style="list-style-type: none"> • Modular plug-in modeling tools. • Advanced texture controls. • Excellent rendering quality. • Availability of network rendering. 	<ul style="list-style-type: none"> • Mediocre animation tools. • Slow rendering. • No true spline-based modeling tools. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Print designers. • Beginning to intermediate animators. • Beginning to advanced users.
Super3D	<ul style="list-style-type: none"> • Precise modeling tools. • Straightforward interface. 	<ul style="list-style-type: none"> • Limited rendering support. • Limited animation capabilities. • Grim prospect for future updates. 	<ul style="list-style-type: none"> • Engineers. • Beginning to advanced users.
Swivel 3D Professional/SwivelMan	<ul style="list-style-type: none"> • Powerful hierarchical linking of models. • Very fast Phong rendering mode. 	<ul style="list-style-type: none"> • Relatively weak rendering quality. • Weak MacRenderMan interface. • Weak texture-map positioning/rendering quality. • No true spline-based modeling tools. 	<ul style="list-style-type: none"> • General 3-D-graphics artists. • Engineers. • Beginning to advanced animators. • Beginning to advanced users.

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3-D Programs

Advanced Users: Production Pros

For advanced users, 3-D modeling and animation — with total control over the highest-quality rendering — are the key. These folks' livelihoods depend on their 3-D packages, and they mix and match products as necessary.

ElectricImage Animation System. ElectricImage is the choice of most professional Macintosh 3-D animators. Its rendering speed and wide variety of file-format importation options make it both fast and flexible, two essential factors in a production environment.

Although ElectricImage does not offer ray tracing, its Phong rendering is the fastest of any of the packages'. The program has the best texture mapping and texture controls, even though it lacks procedural textures. Textures can be applied to objects through an alpha channel, and alphas can also be used to restrict luminance, diffusion, and reflectivity attributes (for example, you can use an alpha channel to create irregular, shiny "embossed" areas on an otherwise dull matte surface). The biggest omission in version 1.05 is that it lacks shadows, but version 1.5 should include them (see the "Future Dimensions" sidebar).

The Transporter file-conversion utility is excellent and can convert just about any type of 3-D-geometry file, even high-end files created with programs such as WaveFront (a 3-D UNIX-based visualization package). The animation interface tends to be a love/hate affair, but the program offers better technical feedback during the rendering process than do any of the other packages. As noted

earlier, Mr. Font, ElectricImage's text-extruding program, is in a class by itself. If your work consists primarily of still and animated 3-D text logos, Mr. Font alone is worth the price of admission (see Figure 6).

ElectricImage comes with a CD-ROM full of textures, sample models and images, and a variety of animation files and utilities. The current version of the software suffers from a weak, disorganized manual and some strange model-importing quirks (particularly frustrating is the way ElectricImage resets the standard axis orientation of imported models, a real pain for advanced users who do a lot of tweaking). Regardless of these drawbacks and its high price, ElectricImage has clearly established itself as *the* industrial-rendering workhorse of the Mac 3-D universe.

MacTOPAS. MacTOPAS is among the most expensive of the all-inclusive packages. Although it has a balanced set of modeling, rendering, and animation tools, it's overpriced in comparison with the potential competition. A good variety of basic and advanced modeling tools, very good rendering quality, and speed are the strong points of this package. The documentation is relatively weak, though, which is a problem, given the hidden power of the program's tools. If MacTOPAS were priced to compete with Presenter Professional, it would be a much more reasonable contender for intermediate and advanced users.

Sculpt 3D and 4D. Sculpt 3D is probably the most capable modeler of the bunch — if you're willing to spend substantial time tackling the dense, nonintuitive modeling

Table 4: 3-D Programs

	Alias Sketch! 1.0.2 ☆☆☆	ElectricImage Animation System 1.05 ☆☆☆☆½	Infini-D 1.1.2 ☆☆☆☆½	MacroMind Three-D 1.01 ☆☆☆
List price	\$995	\$7,495	\$895	\$1,495
Company	Alias Research 110 Richmond St. E. Toronto M5C 1P1 Canada 416-362-9181 416-362-0630 (fax)	Electric Image, Inc. 117 E. Colorado Blvd., Ste.300 Pasadena, CA 91105 818-577-1627 818-577-2426 (fax)	Specular International 233 N. Pleasant St. Amherst, MA 01004 413-549-7600 413-549-1531 (fax)	Macromedia, Inc. 600 Townsend St. San Francisco, CA 94103 415-442-0200
	MacTOPAS 1.01 ☆☆☆	Presenter Professional 1.1 ☆☆☆☆½	Ray Dream Designer 2.02 ☆☆☆☆	Sculpt 3D 2.1 ☆☆☆☆½
List price	\$7,495	\$3,600	\$895	\$2,500
Company	AT&T GSL 3520 Commerce Crossing Ste. 300 Indianapolis, IN 46240 317-844-4364 317-575-0649 (fax)	VIDI 16309 Double Grove La Puente, CA 91744 818-918-8834 818-918-9935 (fax)	Ray Dream, Inc. 1804 N. Shoreline Blvd. Mountain View, CA 94043 415-960-0765 415-960-1198 (fax)	Byte-by-Byte, Inc. 9442A Capitol of Texas N. Hwy. Ste. 650 Austin, TX 78759 512-795-0150 512-795-0021 (fax)

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3-D Programs

interface. The poorly written documentation doesn't make the task any easier, although the three bundled videotapes are actually fairly useful. The learning curve is steep, but if you learn to think the way Sculpt does, you'll be able to model just about anything, regardless of the complexity of the geometry. Sculpt's general rendering quality is top-notch, as are its procedural textures.

The animation capabilities of Sculpt 4D are not really worth the extra \$1,000. If you want the ultimate Mac 3-D animation setup (ease of use and price notwithstanding), Sculpt and ElectricImage are a potent team. A hard-core group of aficionados has mastered the Sculpt interface, and Byte-by-Byte recently unbundled the modeler portion of the program to sell for \$1,495. With a reworked interface, this program could be the modeler to beat.


The Bottom Line

If you're a novice who's looking for the best combination of features and performance at a reasonable price, Infini-D and StrataVision 3d are the two main contenders. Infini-D is more useful for those who are primarily interested in powerful animation capabilities, whereas StrataVision 3d is a better package for high-quality still rendering. Users primarily concerned with rendering speed might consider Ray Dream Designer, which offers better ray-tracing rendering performance than either Infini-D or StrataVision 3d, at the cost of a more complicated interface. Swivel 3D Professional is a good workhorse modeler, but

you'll probably want to wait for its future incarnation, MacroModel (see the "Future Dimensions" sidebar).

For intermediate users, Presenter Professional is a good modeler and renderer, with a balanced set of features and a reasonable price (compared with MacTOPAS'). MacRenderMan artists should consider Presenter Professional as the best front end to the power of MacRenderMan. Although Sculpt is the most powerful modeler of the bunch, it really needs some interface help. If you're willing to spend the time tackling it, though, you'll be able to model just about anything you can imagine.

We'd like to recommend MacroMind Three-D for animation, but before we do, Macromedia needs to spend some time making the product more robust. With better performance and some fine-tuning, Alias Sketch! could be a great NURBS modeler for intermediate users.

High-end users will probably end up turning to ElectricImage Animation System as their primary rendering and animation program, feeding it models from just about anything (thanks to the flexibility of its Transporter file converter). On the modeling side, Sculpt 3D and 4D, Alias Sketch!, and Presenter Professional all come to mind, even given the performance limitations of Sketch! and the interface quirks of Sculpt. MacTOPAS simply prices itself out of the running. 

David Biedny, coauthor of *The Official Adobe Photoshop Handbook*, considers life to be a 3-D movie that doesn't need special glasses.

Table 4: 3-D Programs, continued

	Sculpt 4D 2.1 ★★★½	Showplace/ MacRenderMan 1.1.1 ★★★	StrataVision 3d 2.5 ★★★★½
List price	\$3,500	\$995	\$995
Company	Byte-by-Byte, Inc. 9442A Capitol of Texas N. Hwy. Ste. 650 Austin, TX 78759 512-795-0150 512-795-0021 (fax)	Pixar, Inc. 1001 W. Cutting Blvd. Richmond, CA 94804 510-236-4000 510-236-0388 (fax)	Strata, Inc. Ancestor Square 2 W. St. George Blvd. Ste. 2100 St. George, UT 84770 801-628-5218 801-628-9756 (fax)
	Super3D 2.5 ★★	SwivelMan 1.0.1 ★★★½	Swivel 3D Professional 2.0.4 ★★★★½
List price	\$495	\$895	\$695
Company	Aldus Corp. 411 First Ave. S. Seattle, WA 98104 206-628-2320	Macromedia, Inc. 600 Townsend St. San Francisco, CA 94103 415-442-0200	Macromedia, Inc. 600 Townsend St. San Francisco, CA 94103 415-442-0200

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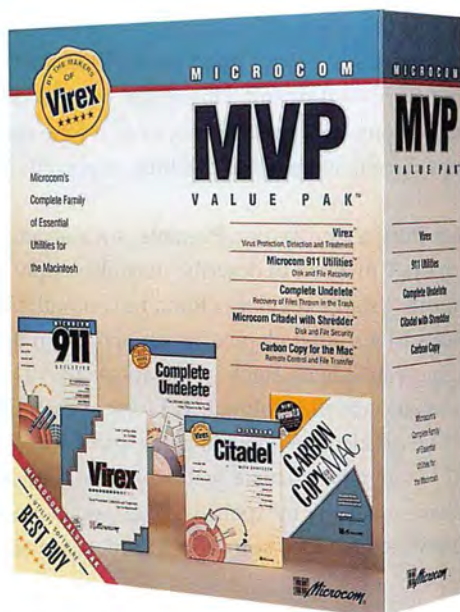
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New Life for Old Macs

Diagnostic Checklist

✓ **System software.** Software tools such as MicroMat's MacEKG (\$150) and Teknosys' Help! (\$149) can help diagnose software conflicts and problems. They also suggest ways to fix performance-robbing extension and control-panel conflicts as well as methods to purge your machine of all the odd bits of software junk you don't need and that slow things down.

✓ **Basic hardware.** For those who want a software diagnostic tool, Maxa's Snooper (\$229) can help find some CPU, SCSI, ADB, NuBus, and memory problems as well as perform benchmark tests and diagnose video-display ailments.

There are plenty of problems that you too can diagnose. Do the keyboard, the screen, the mouse, and the ports in the back function as they originally did? Are any connectors loose, discolored, or unable to hold cables tightly? Does the screen look distorted? Is it dimmer than it used to be? Does the keyboard have sticky or failing keys? Does the mouse roll freely and track the cursor smoothly?

Some of these problems are easy to fix — visit your local computer store for kits to clean your keyboard, mouse, and monitor screen. Other problems may require replacement parts or a trip to a technician or an Apple dealer.

✓ **Power supply.** Check to see whether the display dims at times, the floppy drive sounds funny when spinning a disk, or the machine gives off an acrid smell. Most Mac Plus power supplies start to go after three to four years, because they lack a fan and were underengineered to begin with; Portable and Mac II power supplies are much sturdier and can last indefinitely (in fact, the Portable's lead-acid battery makes the NiCads in the PowerBook 140 and 170 look sickly). Power supplies aren't inexpensive to replace, so pay close attention to the one in your Mac.

Before you part company with your old Mac — and a wad of cash to buy a new one — spend some time in the Mac workshop to see how you can bring that old war-horse up to snuff.

BY DON CRABB

It takes some experience to know what you can do to upgrade an old Mac, and it takes just as much experience to know when it's time to buy a new one. With these concerns in mind, I'm going to give you the benefit of my years as a computer consultant and suggest some upgrade options that might help you decide whether your Mac is able to do the work you want to do.

Obviously, I can't discuss every Mac in this article, so I've chosen three discontinued models that are still in use — the Plus, the Mac II, and the Portable. Why these three Macs? For one thing (assuming that not many of you still use a 128K), they represent the bottom end of the three Mac families — the compact, modular, and portable Macs. Another reason is that there are still a bunch of Pluses and Mac IIs around and they've got a lot of good years left in them. The Portable is a different story — it wasn't a big seller, but if you have one, you probably need some advice on how to coax a little more oomph from what is a decent and reliable machine, especially in an office setting.

If you don't have a Plus, a Mac II, or a Portable, stick around — the upgrades and repairs I'm about to describe may also apply to your Mac. What's more, I start a regular column next month that will look at the various Macs' upgrade-and-repair options in detail.

Before we start, give your Mac a quick physical (see the "Diagnostic Checklist" sidebar), and then join me as I look at each of the three Macs in turn. I've divided the upgrade paths into three categories: *essential* — upgrades that are well worth the time and expense required; *easy* — usually inexpensive fixes you can do yourself; and *expensive* — upgrades you should think twice about.



Performance Enhancers

Mac Plus Family History

Although Apple has expanded the Mac line far beyond the original 128K beige toaster, that growth has remained focused on only three kinds of Macs. At the bottom end are the compact Macs, currently represented by the Classic and Classic II (but also including the 128K, 512K, 512Ke, Plus, SE, and SE/30 models). Compact Macs comprise an upright plastic case that contains a 9-inch monochrome monitor and a logic board that holds the CPU, some memory (most of the Plus' memory is on an add-on daughterboard), support circuitry, ports (Pluses lack ADB [Apple Desktop Bus] ports) and related electronics, and an analog-video board that drives the built-in display.

The second generation of compact Macs began with the Mac Plus, which debuted in 1986 and bowed out in 1990 to make way for the Classic. With its built-in 800K floppy-disk drive and SCSI external connector, the Plus was the first serious business Mac.

Apple sold hundreds of thousands of Mac Pluses, and many remain in service today, despite the machine's serious limitations: a glacial 8-megahertz 68000 CPU, a maximum of 4 megabytes of RAM, no color-display capability,

a single 800K floppy-disk drive, no internal hard drive, no ADB ports, and no expansion bus. Yet, although Mac Pluses won't win any speed awards, they can still be useful machines that can even run System 7.

Best Tasks

Increase memory to 4 megabytes and keep the software load down, and your Mac Plus will work fine in many settings. You can do word processing, work with flat-file databases and small spreadsheets, and do simple graphics work on a Mac Plus. It can also function as a decent LocalTalk file server with AppleShare 3.0 or DataClub Elite if you max out the memory and plug it in to a large, fast hard-disk drive.

Mac Plus Upgrades

Essential. The best upgrade for the Plus is a memory boost to 4 megabytes of RAM, which lets you goose up the speed for around \$100. You can do this yourself, but it involves cracking open the case, cutting two resistors loose if you're upgrading from 1 megabyte, removing the old 256K SIMMs, and replacing them with 1-megabyte SIMMs. Unless you know what you're doing, consider having a dealer do this. Some don't charge extra for such an installation, but others charge as much as \$200. Alternatively, ask the firm you buy the memory from if it has any step-by-step instructions (written or on video). Remember that if you're doing it yourself, you need special

equipment (a case cracker and a Torx screwdriver) to get the case open. Memory vendors can supply you with these tools.

With 4 megabytes of RAM on-board, it's time to install a minimal System 7, with only the fonts, extensions, and control panels you really need. This will let you use

Table 1: Recommended Upgrades for the Mac Plus




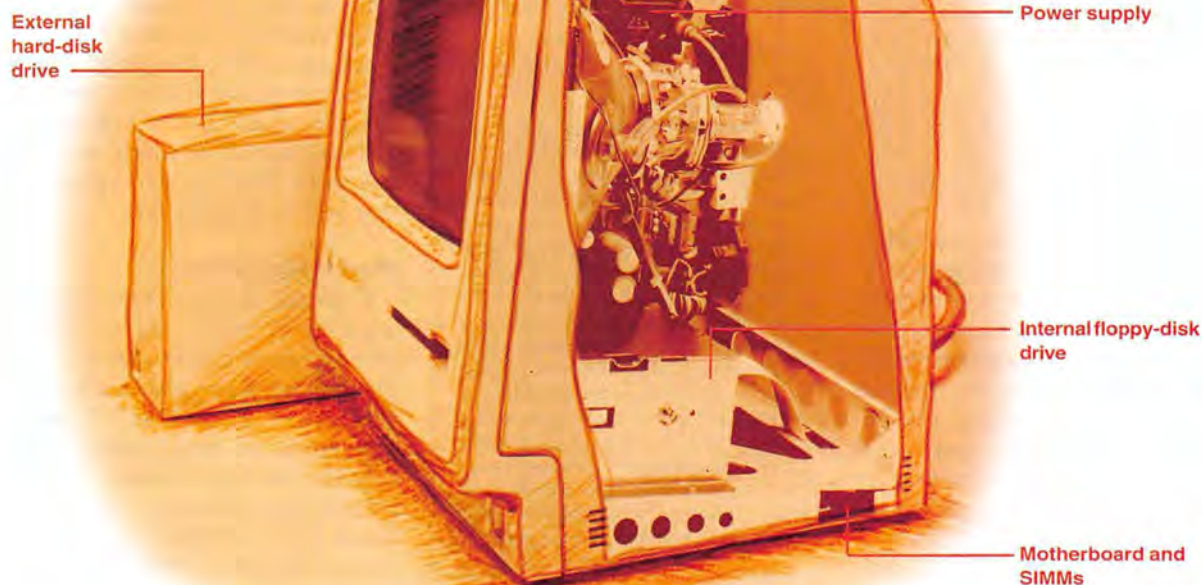
Upgrade	 Pros	 Cons	 Approximate Cost
Battery	Keeps clock accurate.	None.	\$10
Up to 4 MB of RAM	Faster. Ability to use System 7 or MultiFinder.	None.	\$100
External fan	Keeps the power supply cool.	Blows dirt into the machine.	\$80 to \$100
New power supply	Old power supply isn't robust and can be strained.	Expensive.	\$300
Third-party SuperDrive	Gives you 1.44-MB disk capacity.	High-density disks incompatible with other old Macs' drives.	\$400 to \$500
External hard-disk drive	Boosts productivity. Usable with other Macs.	None.	\$400 and up
External monitor	Easy on the eyes. Good for spreadsheets and DTP.	Finicky to install and expensive.	\$500 and up
CPU accelerator	Faster CPU.	Has Plus ROMs, so can't take advantage of all new software. Can strain old power supply.	\$800 to \$1,600
System software	Minimal System 7 gets you into the new game in town.	Needs 4 MB of RAM. System 7 slower than System 6.	\$100
New input devices	A new mouse or trackball can make an old Mac feel new.	Plus lacks an ADB port to make this easily possible.	\$70 and up
Total price			\$2,760 and up
Street price of new Mac Classic II 4/40			\$1,600
Street price of new Mac LC II 4/40			\$2,100

Table 1: Although minor upgrades and repairs can lengthen the life of a Plus, this table shows that a full-blown upgrade doesn't make good sense — it costs way too much. You'd be better off buying a Classic II or an LC II.

Mac Plus



applications that have special features such as publish-and-subscribe. Even with only 4 megabytes of RAM, you can still run several medium-sized apps simultaneously under System 7's built-in cooperative multitasking. You won't, however, be able to use System 7's 32-bit-addressing scheme or virtual memory. System 7 is not essential — if you don't need any of its special features, you might as well use System 6, because it's faster.

Another good upgrade is to add an external hard-disk drive (take it with you when you move up to your next Mac). A 100-megabyte external hard drive can be found for as little as \$400.

Easy. Besides getting a new external hard drive, adding a new or replacement keyboard or a new mouse makes sense for many Plus owners. Remember that because the Mac Plus doesn't have an ADB port, any keyboard or mouse you buy for it won't be easy to use with ADB-equipped Macs. A new keyboard costs about \$125. Replacement or upgrade mice start at about \$70.

Expensive. Consider adding an external monitor. It will be expensive — \$500 or more — and it'll be a pain to install without an expansion slot, but you'll be giving your eyes a break when doing DTP, spreadsheet, or even basic word-processing work. You can forget about color, however, because Mac Plus ROMs don't support it. Nor can the Plus support an internal 1.44-megabyte SuperDrive floppy-disk drive, although you can add an external SuperDrive from a third-party vendor such as PLI. If you need to replace the internal floppy drive, you'll spend between \$200 and \$400. An external third-party SuperDrive-compatible floppy drive costs more than \$500.

Unless you absolutely have to have high-density-disk compatibility, this is an upgrade to skip.

If you'd like to upgrade the Plus' CPU, be forewarned that the computer lacks any sort of expansion or PDS (processor-direct slot) to plug an accelerator in to. There are 68020 and 68030 upgrade boards that can be installed in a Plus, but the job is best left to the pros, because it involves some fancy wire wrapping, clipping, and soldering. Some CPU-upgrade cards for the Plus can be equipped with external video capabilities and more than 4 megabytes of RAM. You can expect to pay around \$1,000 for a 33-megahertz 68030 accelerator board for a Plus.

A 33-megahertz FPU (floating-point unit, also referred to as a *math coprocessor*) can add another \$250 to \$300. Plug this in to your new 33-megahertz accelerator, and you'll dramatically improve the performance of any product that uses floating-point arithmetic, such as spreadsheet programs and some graphics programs.

As long as a Plus is using the original 128K ROM, there is a limit to the improvements an accelerator can provide. It simply can't turn your Plus into a modular Mac, for example, and Apple doesn't make an upgrade motherboard for the Plus that would make it comparable to a Classic or Classic II. Adding an accelerator board might also strain an already overworked power supply or result in too much heat buildup on the machine's circuit boards. The Plus lacks a built-in fan, and external fans have the bad habit of blowing dirt into the machine. Frankly, no matter what speed gains accelerator boards might provide, I simply wouldn't waste the money on them. They're too costly and still don't fully modernize your Plus.

Performance Enhancers

Mac II Family History

Modular Macs, of which the Mac II was the first example, hit the streets in late 1987. With these machines, Apple said goodbye to the compact, all-inclusive case of the Mac Plus and opted instead for a traditional PC-style set of stacked boxes. The bottom box is a large case that can hold two floppy-disk drives (although only one was standard in the original configuration), a full-height hard-disk drive, a huge power supply and fan, six NuBus expansion slots, and a large motherboard. The top box is a monitor, which is purchased separately. The Mac II sports a 16-megahertz 68020 CPU and eight SIMM slots. The base model lacks a PMMU (paged-memory-management unit), so it can't use System 7's virtual-memory feature. A standard Mac II doesn't work with System 7's 32-bit-addressing feature, which limits it to a maximum of 8 megabytes of RAM, because it lacks 32-bit-clean ROMs.

Apple stopped making the Mac II in 1990, by which time the Mac IIfx, IICx, IICI, and Mac IIfx were available. The IICx and IICI have a smaller case and only three NuBus slots. The IIfx had a redesigned motherboard to

accommodate a 16-megahertz 68030 CPU (with on-chip PMMU) and a 68882 FPU. The IIfx used another updated motherboard design based on a 40-megahertz 68030. The latest modular Macs are the Mac LC, which has a 16-megahertz 68020; the IIsi, with a 20-megahertz 68030; the Quadra 700, a 25-megahertz 68040 that comes in a IIsi-sized case with two NuBus slots; and the Quadra 950, which has a 33-megahertz 68040 and comes in a tower case with five NuBus slots.

Best Tasks

The Mac II makes the most sense for serious upgrading and long-term use. With its built-in 68881 FPU chip, spreadsheets and database reports can be generated quickly, as long as you have a minimum of 8 megabytes of RAM. Add more RAM and a fast hard drive, and you have a great file server — with six NuBus slots, you can add Ethernet or token-ring cards with impunity. It also makes a good print server when connected to a PostScript printer. Throw in an accelerator, and you've got near-Quadra performance for a much lower cost.

The Mac II is also an excellent basic office or home machine. You can add large-format monochrome or color monitors as well as just about any other kind of NuBus specialty board, such as an accelerated-video card, a DSP (digital-signal processing) board, or a video-capture board.

Mac II Upgrades

Essential. Because of the Mac II's stout power supply and six NuBus slots, it makes a solid, cost-effective platform for adding accelerator cards, more RAM (as much as 128 megabytes, using 16-megabyte composite SIMMs), and faster internal and external hard drives. Strapping on a newer, much faster internal hard drive to replace the older, slower one you're currently using (probably an old 40-megger) is easy enough. Many vendors, including Apple, make one-half- and one-third-height drives you can fit easily into the space formerly occupied by a full-height Quantum mechanism. Adding an external hard drive also makes sense for this workaholic

Table 2: Recommended Upgrades for the Mac II




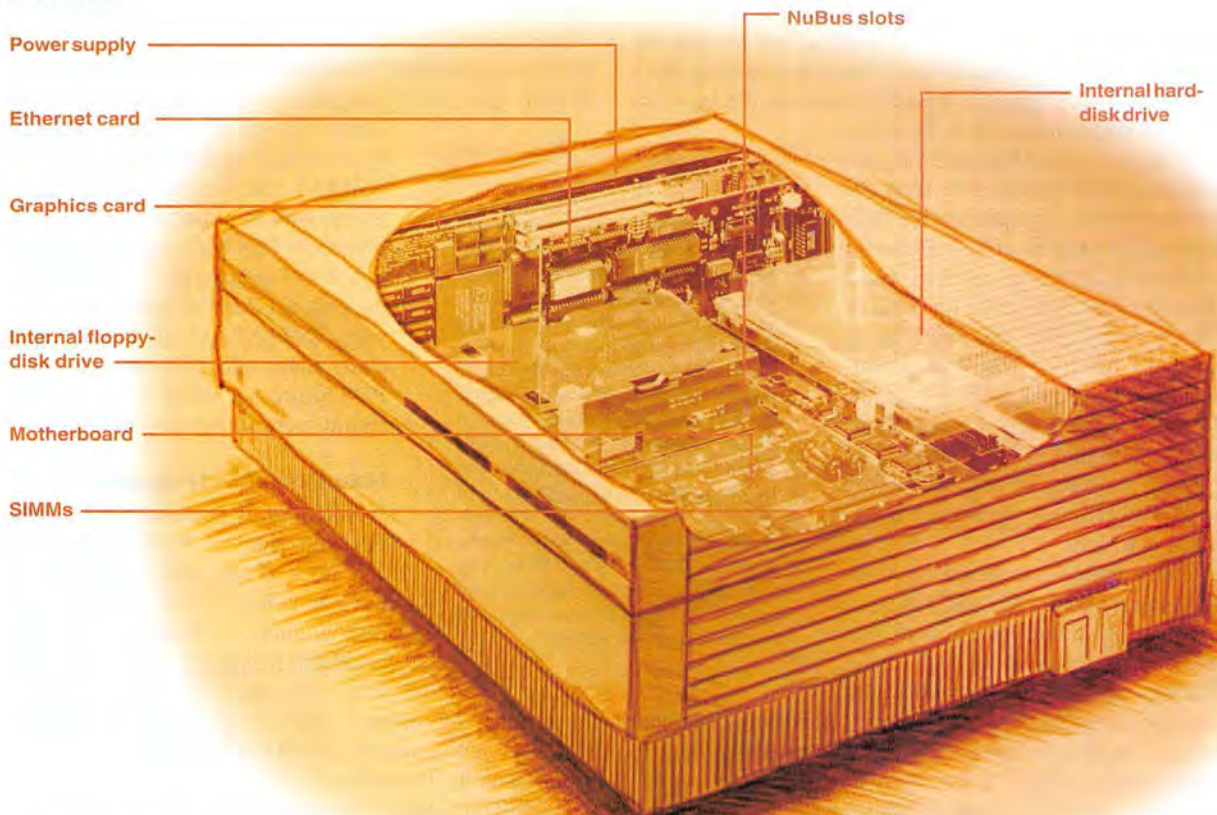
Upgrade	 Pros	 Cons	 Approximate Cost
MODE32	32-bit cleanliness.	None.	free
8 MB of RAM	Faster.	None.	\$200
32 MB of RAM	If you can afford this, go for it.	None.	\$1,000
NuBus Ethernet card	EtherTalk speed where applicable.	None.	\$250
Third-party SuperDrive floppy-disk drive	Gives you 1.44 MB of disk capacity.	Can't use high-density disks with some older Macs.	\$400 to \$500
External hard-disk drive	More storage space.	None.	\$400 and up
Large-format monochrome or color monitor	Easy on the eyes.	Expensive.	\$900 to \$5,000
PMMU	Can use System 7's virtual memory.	Installation can be tricky.	\$100 to \$200
CPU accelerator	Faster CPU.	68040 boards cause some software incompatibilities.	\$1,000 to \$3,000
IIfx replacement motherboard	Faster. Built-in SuperDrive.	Expensive.	\$3,000
System software	Full System 7.	None.	\$100
New input devices	A new mouse, trackball, or keyboard can make an old Mac feel new.	None.	\$50 and up
Total price			\$7,400 and up
Street price of new Mac Quadra 950 8/400			\$8,000

Table 2: The Mac II is a great platform for building nearly any modern Mac you might need. With its six NuBus slots and built-in FPU chip, you can easily and relatively inexpensively add accelerators, memory, and peripherals to boost performance.

Mac II



machine. The Mac II can use a wide variety of NuBus-based CPU upgrades, from solid 68030 designs (DayStar Digital makes the PowerCache line of boards, which I've used with considerable success — the 50-megahertz PowerCache is particularly sweet at a price of around \$1,300) to units such as the 33-megahertz 68040 Radius Rocket 33; TokaMac boards, from Fusion Data Systems; and forthcoming Intel i860-based cards. These NuBus accelerator cards range from \$500 to more than \$2,000.

Easy. If you really want to pump up the performance of your Mac II, you'll need a software upgrade: MODE32, a 32-bit memory extension from Connectix, which is distributed free by Apple (you can get a copy from user groups and on-line services such as America Online and *MacUser's* ZiffNet/Mac). MODE32 cleans up the 32-bit-dirty ROMs on Mac IIs, IIfx's, IICx's, and SE/30s so they can use System 7's 32-bit-addressing option.

This means that you can break the real-RAM barrier of 8 megabytes. To use MODE32, just drag it into your System Folder and restart. Then you can use the Memory control panel to turn on 32-bit addressing, which lets you use software that simply won't work without it. If you've installed a 68851 PMMU (about \$99 from a third-party chip house) in your Mac II, you can also use part of your

Ii's hard disk as a page-swapping area for virtual memory. You don't need a PMMU if you have a 68030 or 68040 accelerator: It's built in to those chips.

Expensive. Consider adding a IIfx motherboard upgrade from Apple. For around \$3,000, you can swap your old motherboard for the 40-megahertz 68030 power of the IIfx. Even though Apple is phasing out the IIfx, this is a good deal for Mac II owners who can still find the boards. Some dealers may be discounting the boards' prices. Besides the faster CPU, you get built-in support for a SuperDrive floppy drive, faster SCSI, faster NuBus, new 32-bit-clean ROMs, and a host of other performance tweaks that simply adding a CPU accelerator can't necessarily match. You're also buying Apple hardware, which provides a more flexible path for upgrades than does adding a third-party accelerator.

If you've added a fast hard drive, make the most of it with a SCSI-2 card from a vendor such as PLI or MicroNet (\$400 and up). The standard data rate between the Mac II's CPU, its RAM, and the built-in SCSI tops out at less than 2.5 megabytes per second. With a SCSI-accelerator card added, however, you can raise this data rate to more than 10 megabytes per second, dramatically improving the apparent speed of connected hard drives.

Performance Enhancers

Mac Portable Family History

The first Mac Portable became available in late 1989. Heavily criticized because of its boat-anchor weight and dimensions, the Portable is one of the worst-selling Macs ever. Even so, it appears frequently among the business clients I've consulted for and you can find new or used Portables at bargain-basement prices. I've seen ads in *MacWEEK*, for example, for fully equipped Portables with 9 megabytes of RAM, a 2,400-bps modem, and a 40-megabyte hard drive for \$1,200. That's an excellent buy for a three-year-old machine that has performance comparable with that of the Classic. Apple stopped manufacturing the Portable in 1991, just before passing the torch of Mac portability to the PowerBooks, its first notebook-sized machines.

The Portable was based on a 16-megahertz 68000 CPU and was quite a technology trendsetter, with its reliance on expensive SRAM (static RAM), special ASICs (application-specific integrated circuits), a fancy power-management system (including a lead-acid battery rumored to be able to jump-start a Yugo), a fast active-matrix screen, a 40-megabyte hard drive, and a 1.44-megabyte SuperDrive. Many Portables also came equipped with Apple's 2,400-bps modem (although third-party modems were and still are available).

The Portable came in two versions: the original non-backlit model and a 1990 revision that included a backlit screen. For about a year, Apple sold a Portable backlight

upgrade kit for about \$1,000, but that item disappeared from its price list when the PowerBooks were released.

The original model came with only 1 megabyte of RAM, expandable to 2 megabytes with Apple's expensive SRAM card and 5 megabytes with third-party SRAM cards. The backlit model had 2 megabytes of built-in RAM and could use PSRAM (pseudostatic RAM) effectively, with third parties providing 8-megabyte PSRAM cards to jump the RAM to 9 megabytes. Theoretically, the original Portable could use third-party PSRAM add-ons too — especially those added to the machine's PDS (processor-direct slot) — but the results were sometimes unreliable.

Mac Portable Upgrades

Essential. If you own a nonbacklit Portable, find an Apple dealer who can track down and install one of those wonderful — if expensive and discontinued — backlight kits. The backlight makes the Portable live up to its name, because you're freed from the tyranny of ambient light. It essentially makes the Portable's active-matrix screen similar to what Apple has installed on the PowerBook 170.

Easy Third-party 8-megabyte PSRAM cards can boost a Portable's memory to 9 megabytes, but it can be hard to find a dealer that stocks Portable memory. These cards plug in to the PDS.

Expensive. You can forget CPU upgrades for the Portable. They simply don't exist, despite the inviting PDS that's waiting to be exploited. The hard-drive-upgrade

Best Tasks

The Portable is a good midlevel word-processing machine and spreadsheet cruncher if it has 8 or 9 megabytes of RAM. Unfortunately, you may have difficulty tracking down memory upgrades for the Portable. It also works nicely as a luggable network-diagnostic machine when loaded with software such as Technology Works' GraceLAN or ON Technology's Status-Mac, which can be plugged in to different parts of your LocalTalk LAN. With an external Ethernet adapter, such as one from Farallon, Asanté, or Shiva, you can also use it for diagnostics on EtherTalk LANs: Expect to pay at least \$450 for the adapter.

Table 3: Recommended Upgrades for the Mac Portable




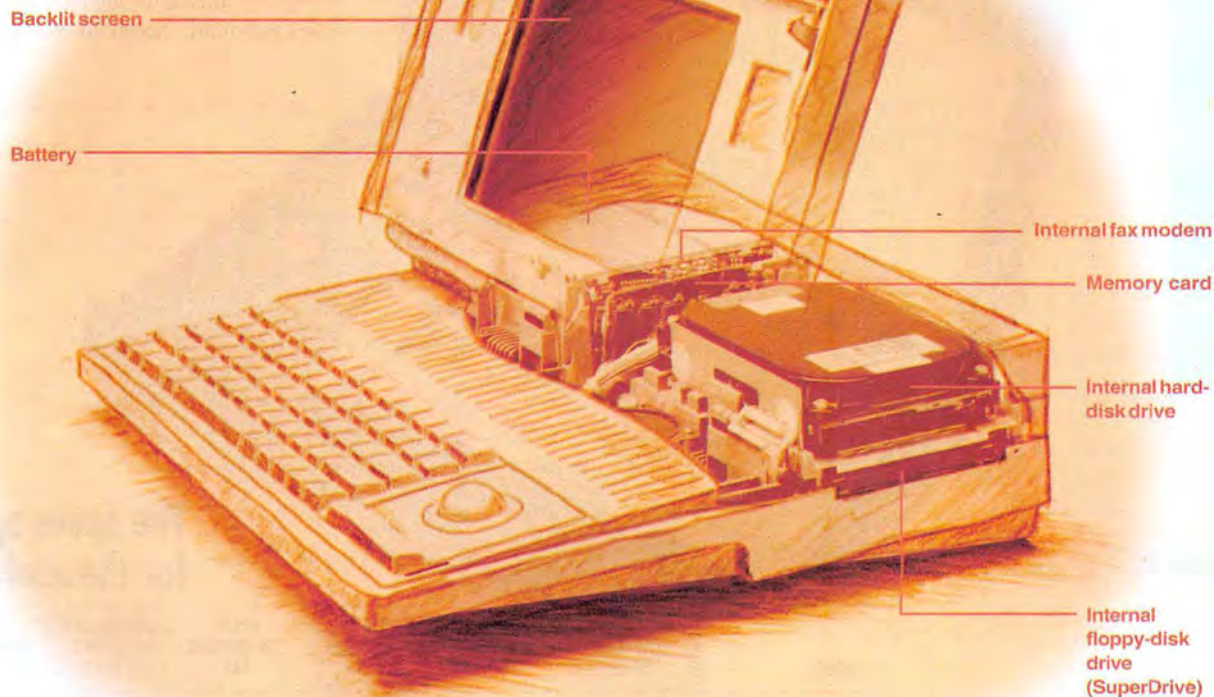

Upgrade	 Pros	 Cons	 Approximate Cost
Up to 8 MB of RAM	Faster. Lets you use System 7.	Hard to find.	\$450 and up
Internal or external hard-disk drive	Better work-load capacity.	None.	\$500 and up
External Ethernet adapter	Lets you use the Portable for network diagnostics.	Expensive.	\$450 and up
Internal modem	Telecommunications possible.	Can't be used on other Macs.	\$400
Backlight upgrade	Easy on the eyes.	Dealer-installed only. Discontinued, so may be hard to find.	\$1,000
System software	Full System 7.	Needs 8-MB upgrade.	\$100
Total price			\$2,900 and up
Street price of new PowerBook 170 4/40			\$3,649

Table 3: Because the Portable is only a few years old and is pretty sturdy, you're unlikely to have to shell out much for repairs. If it makes you feel more secure, however, consider getting an AppleCare contract from your local Apple dealer. This will limit your costs for any repairs down the line.

Mac Portable



story runs along similar lines. You might find a vendor or two that's still selling internal hard drives for the Portable in sizes bigger than the standard 40 megabytes, but the search may be brutal. You'd be wiser adding external SCSI storage to your Portable, because it can be used on other Macs. If you want to maintain some portability, try a

compact hard drive from Liberty, La Cie, or Mirror. You can find them in sizes as large as 210 megabytes. 

Don Crabb is the director of labs and a senior lecturer in computer science at the University of Chicago as well as *MacUser's* newest contributing editor. His new column, *The Mac Workshop*, starts next month.

For Your Information

Some of the products and techniques mentioned in this article have been covered in detail in previous *MacUser* articles. You'll also find more than 1,000 condensed mouse-rated reviews in "MiniFinders Buyer's Guide," August '92, page 87. Relevant articles are listed here in reverse chronological order.

"System Lite," May '92, page 217 — How to streamline System 7 and eliminate the features you don't need.

"How to Buy Memory," February '92, page 259 — Points to consider when expanding your Mac's memory.

"The Ultimate System Folder," January '92, page 94 — A list of 50 simple ways to supercharge System 7 inexpensively.

"How to Buy Hard-Disk Drives," December '91, page 225 — Here's what you need to know when you're in the market for space.

"How to Buy Monitors," November '91, page 217 — A checklist of monitor fundamentals.

"Keyboard Care and Feeding," June '91, page 221 — Quick and easy steps that can help keep your keyboard in action.

"SIMMple Pleasures," April '91, page 194 — All you need to know to buy and install the right SIMMs at the best price.

"New Year's Resolutions," January '91, page 237 — Ten general maintenance steps to help keep your Mac running like new.

"The Self-Supporting Mac," October '90, page 263 — A comprehensive list of frequently asked questions with answers, covering topics from powering your Mac overseas to the best backup methods.

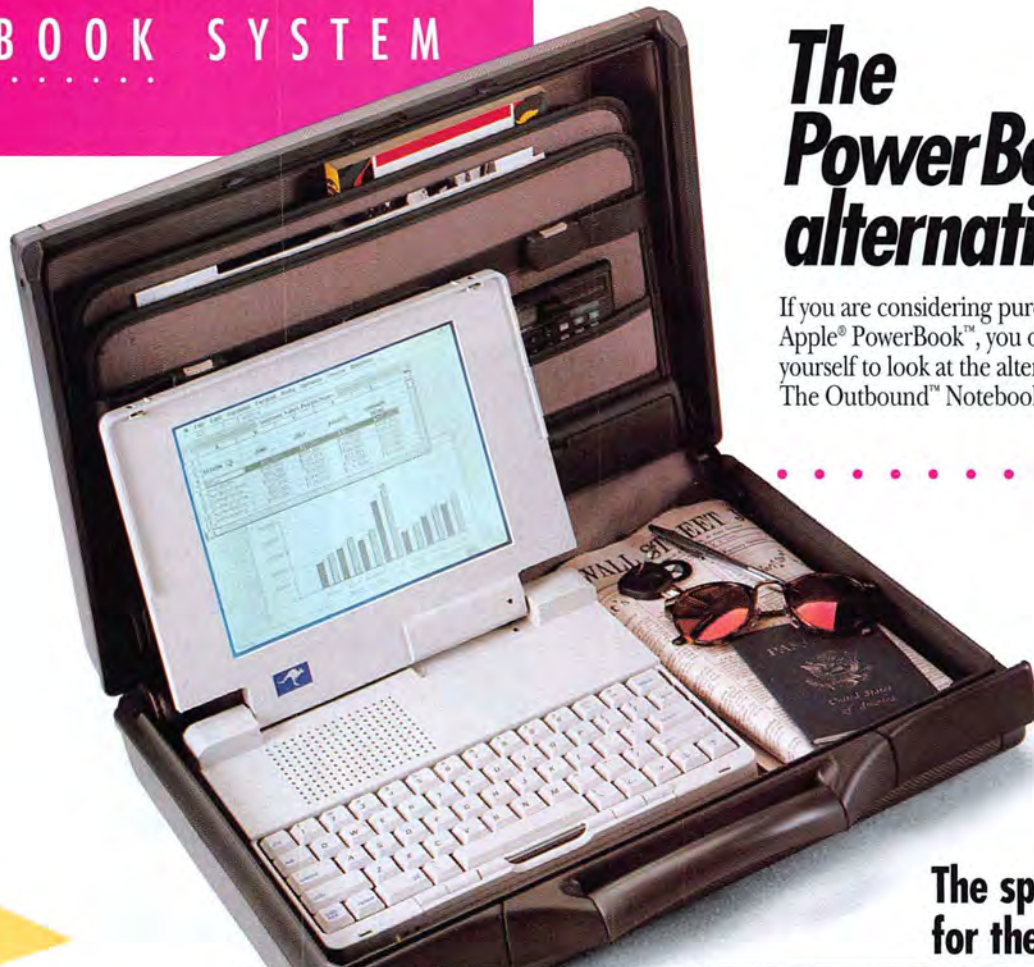
"In Search of the Ultimate Mac," September '90, page 230 — Check out the "UltiPlus" section for tips on making the Mac Plus faster and more powerful.

"Chasing the IIfx: Accelerators," August '90, page 84 — A comprehensive review of 28 accelerator cards for the Mac 128K, 512K, 512Ke, Plus, SE, SE/30, II, IIfx, IICx, and IICI.

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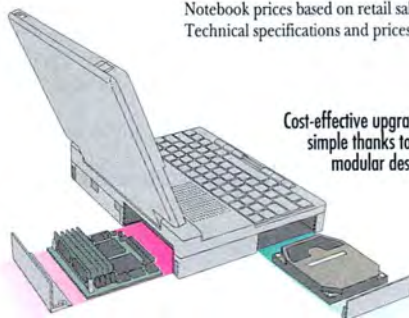
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Upgradeable CPU	YES	No	YES	No	YES	No
Internal Floppy Standard	YES	No	YES	Yes	YES	Yes
Processor Speed	68000 20 MHz	68000 16 MHz	68030 20 MHz	68030 16 MHz	68030 25 MHz	68030 25 MHz
Maximum Hard Drive Available	120 MB	40 MB	120 MB	80 MB	120 MB	80 MB
Full size silent keyboard and true notebook size	YES	No	YES	No	YES	No
Maximum RAM Available	4 MB	8 MB	4 MB	8 MB	14 MB	8 MB
Math Coprocessor	No	No	Optional	No	Optional	Yes
Price	\$1999 2000/220 2 MB RAM 20 MB HD	\$1599 100/220 2 MB RAM 20 MB HD Ext. floppy	\$2799 2030/440 4 MB RAM 40 MB HD	\$2999 140/440 4 MB RAM 40 MB HD	\$3299 2030E/440 4 MB RAM 40 MB HD	\$4299 170/440 4 MB RAM 40 MB HD

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YES	Not Available
68030 33 MHz	Not Available
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Optional	Not Available
\$3899 2030S/440 4 MB RAM 40 MB HD	Not Available

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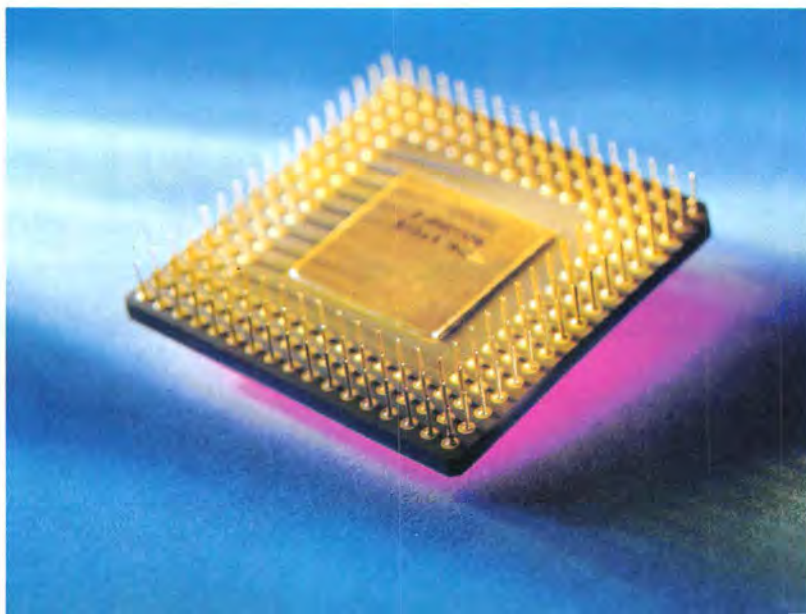
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software run
on them?

Nobody likes to wait for a computer to do its job. When you launch an application, you don't want to stare at an artistic splash screen. You want to get to work. When you rotate a 20-megabyte color image, you don't want to watch a progress bar for ten minutes. You want your image to *be rotated*. And if your Mac can't perform your requested task without delay, you want it to at



One of Apple's
agreements
with IBM is a
plan to develop a
new set of
microprocessors
based on IBM's
POWER chip set.



Agents could perform tasks such as automatically sorting incoming voice and electronic mail at your office.

Has Gone Before

BY HENRY BORTMAN

least let you do something else while you wait.

There are two basic reasons why you can't have what you want. Yet. Reason No. 1: The microprocessor that powers your Mac is too slow. Reason No. 2: In some fundamental ways, the Mac's operating system is obsolete.

So you wait.

OK, OK, I can hear the chorus of critics already. "What do you mean, the Mac isn't fast? What about the Quadra 950?" And "How can you say that the Mac can't do two things at once? System 7 lets you run as many apps as you want."

Sure. I'll concede that things have improved. The Quadra 950 certainly has a performance edge over the 128K Mac. And System 7's multitasking is definitely a step up from the original quit-one-app-go-back-to-the-desktop-and-launch-another-app Finder. But are you really satisfied?

Didn't think so.

But take heart. Apple has two projects in the works that should ease your frustration. One is hardware and goes by the name of PowerPC. PowerPC is the collective name of a family of four new microprocessor designs that Apple, IBM, and Motorola are codeveloping. They'll be at the core of tomorrow's Macs. And they'll be fast — even the slowest units will outperform today's top-of-the-line 68040 processors. Each of the four designs, will, over time, be available in several different chips, much as today's 68030 comes in several varieties, each with a different clock speed.

The second project is a reworking of some of the basic functions of Macintosh system software. The new system will still be System 7, but it will be architected differently from today's system. Among the benefits: Programs will run in the background more smoothly, and when an application crashes, the whole system won't crash with it.

Future Macs

The PowerPC That Will Be

One of Apple's agreements with IBM is a commitment to develop a new set of microprocessors based on IBM's POWER chip set. POWER is a RISC (reduced-instruction-set computing) design that's used in IBM's RS/6000 workstations. Other popular RISC designs include Sun's SPARC and SuperSPARC chips, used in its SPARCstation and SPARCserver computers, and MIPS' R3000 and R4000 chips, used in workstations from Silicon Graphics, DEC, and other vendors.

Although RISC has taken hold in the workstation market, today's desktop machines — Macs and PCs — are based on CISC (complex-instruction-set computing) microprocessors. These terms, *RISC* and *CISC*, refer to how microprocessors process information. It might seem that a reduced instruction set would be a step backward, but actually it makes it possible for RISC chips to process information much faster than CISC chips can.

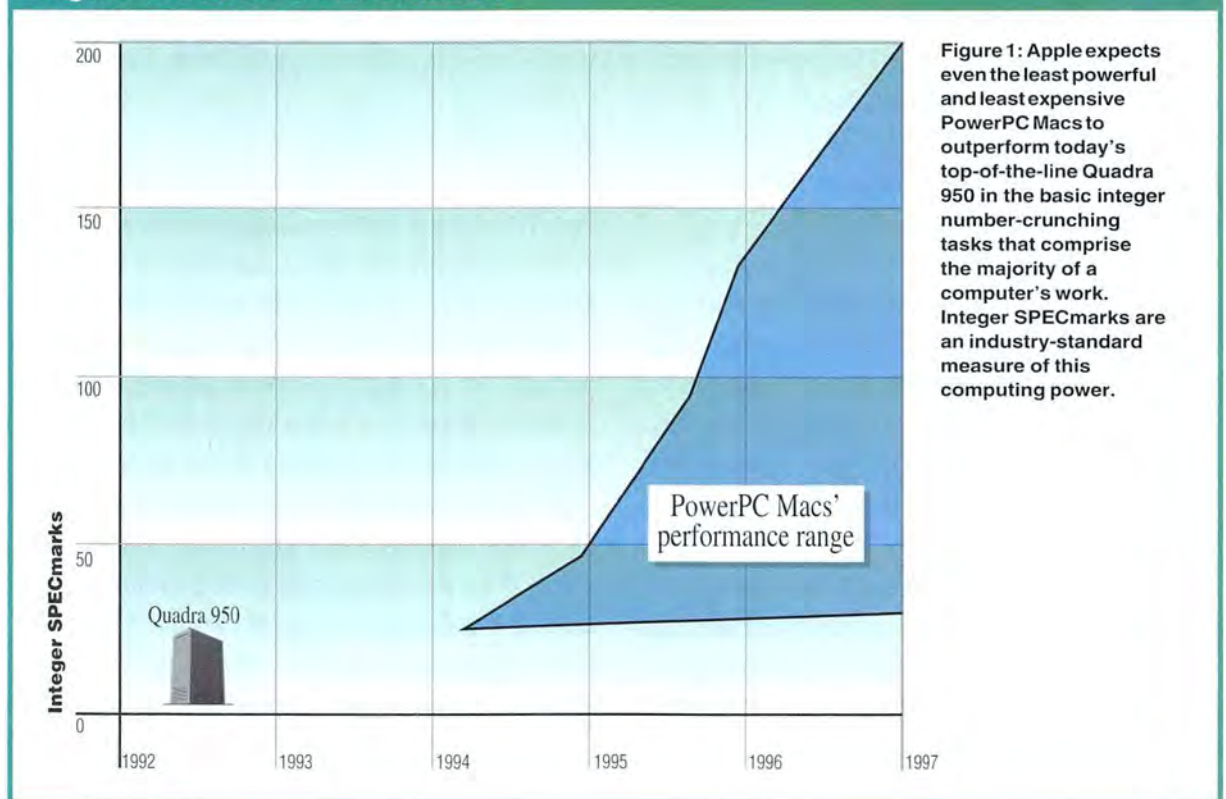
In fact, many computer vendors speculate that CISC architectures such as the Intel 80x86 (the processor family that includes the 80286, 80386, and 80486, which are used in PCs) and the Motorola 680x0 (including the 68000, 68020, 68030, and 68040, used in Macs) are nearing the peak of their performance potentials. They believe that to achieve a significant leap in performance beyond today's

desktop computers, future systems will have to switch to RISC (see Figure 1).

Apple has said that the future of the Mac is in PowerPC-based computers, and the company means it. Apple, IBM,

Casper
voice-recognition
technology
will let you
command your
Macintosh by
talking to it.

Figure 1: PowerPC Performance





and Motorola are spending somewhere around a billion dollars to develop a set of four different PowerPC chips to power future Macs. Although these new processors will be screamers compared with today's machines, Apple plans to deploy them not only at the high end but also throughout the Mac line. In fact, the first chip off the assembly line will be the PowerPC 601, designed for machines in the middle of today's Mac price range (see Figure 2).

Start saving now. Macs based on the 601 should start showing up sometime in 1994. These will be followed by desktop systems, based on the PowerPC 604 chips, with prices starting at around what a IIfx costs; the portable and low-cost systems will be based on the low-power, inexpensive 603; and ultraperformance desktop and server systems will be based on the 620, with correspondingly premium prices.

Users will benefit from this increased performance in three ways. The most obvious one is that faster Macs will make applications run faster. The second is that high performance will become less expensive. This is generally true in the computer industry. The \$3,000 or so that you had to pay in 1984 for an 8-megahertz 68000-based Mac with 128K of RAM and a 9-inch monochrome monitor would today buy you a 16-megahertz 68030-based LC II with 4 megabytes of RAM, an 80-megabyte hard drive, and a color monitor, and you'd probably have some money left over for buying software. But the shift to PowerPC

will represent a quantum leap in that trend.

The third benefit is the most exciting. Maybe you've heard about Casper, the voice-recognition technology that Apple is working on. Casper will let you command your Mac by talking to it. Maybe the promise of pen-based Macs intrigues you. Support for pen input would let you use your Mac in situations where you couldn't use a keyboard and could dramatically change the way artists approach a computer. Maybe you can't wait for intelligent agents to hit the scene. Agents could perform tasks such as automatically sorting incoming voice and electronic mail at your office, deciding — based on your previous instructions — what was important to you, and forwarding it to the off-site conference you're attending.

What all these technologies have in common is that they require tremendous computational power, which only the most powerful of today's desktop computers even begin to provide. PowerPC will lay a new high-performance-computing foundation that will make these and other advanced technologies commonplace.

Compatibility

But let's take a step back from visions of the *USS Enterprise* to a little harsh reality. Those of you who were early purchasers of 68040-based Mac Quadras know that with new chip designs come compatibility headaches. Many Mac applications wouldn't run on the Quadras until the software vendors released new versions, even though the 68040 was part of the same microprocessor family as the 68000, 68020, and 68030 that powered earlier Macs. So, pop quiz: What would you expect to happen when you try to run today's applications on a Mac containing a processor with a *completely* different design?

Although bookies in Vegas are already taking bets, Apple says not to worry. The PowerPC operating system will provide a 68020-emulation mode that should enable today's applications to run straight out of the box — without modification. In much the same way that Insignia's SoftPC uses a Mac's 680x0 processor to emulate a PC, enabling you to run DOS programs on a Mac, Apple will use the PowerPC's horsepower to create a software emulation of a 68020-based Mac so you can run existing Mac applications on a PowerPC Mac (see the "Old Apps, New Tricks" sidebar for more details).

Apple faces the same problem that application developers do. System 7 is written for 680x0 processors, and it won't run on a PowerPC-based computer. At least at first, Apple's going to have to convert portions of the system to native PowerPC code and emulate the rest.

Future Macs

To further complicate matters, Apple's going to need several years to replace all the 680x0 models in the product line with PowerPC equivalents. And even then, there is still the small matter of an installed base of several million 680x0-based Macs whose users are unlikely to appreciate being left behind. So Apple will need to maintain two concurrent versions of the Mac operating system, one for 680x0 Macs and the other for PowerPC Macs.

Apple says that it will do all it can to minimize the pain involved in this situation. For example, it's working to develop a new application installer that will let you choose among installing a program for 680x0 Macs, PowerPC Macs, or both. If you choose both, it'll take up a little more room on your hard drive, but you'll be able to run the same copy of the application on either type of machine. In fact, you'll be able to move a hard disk between a 680x0 Mac and a PowerPC Mac and have all the programs on it work with either system. With a little luck — OK, with a *lot* of luck — you'll be able to do the same thing with the operating system itself.

Revising the System

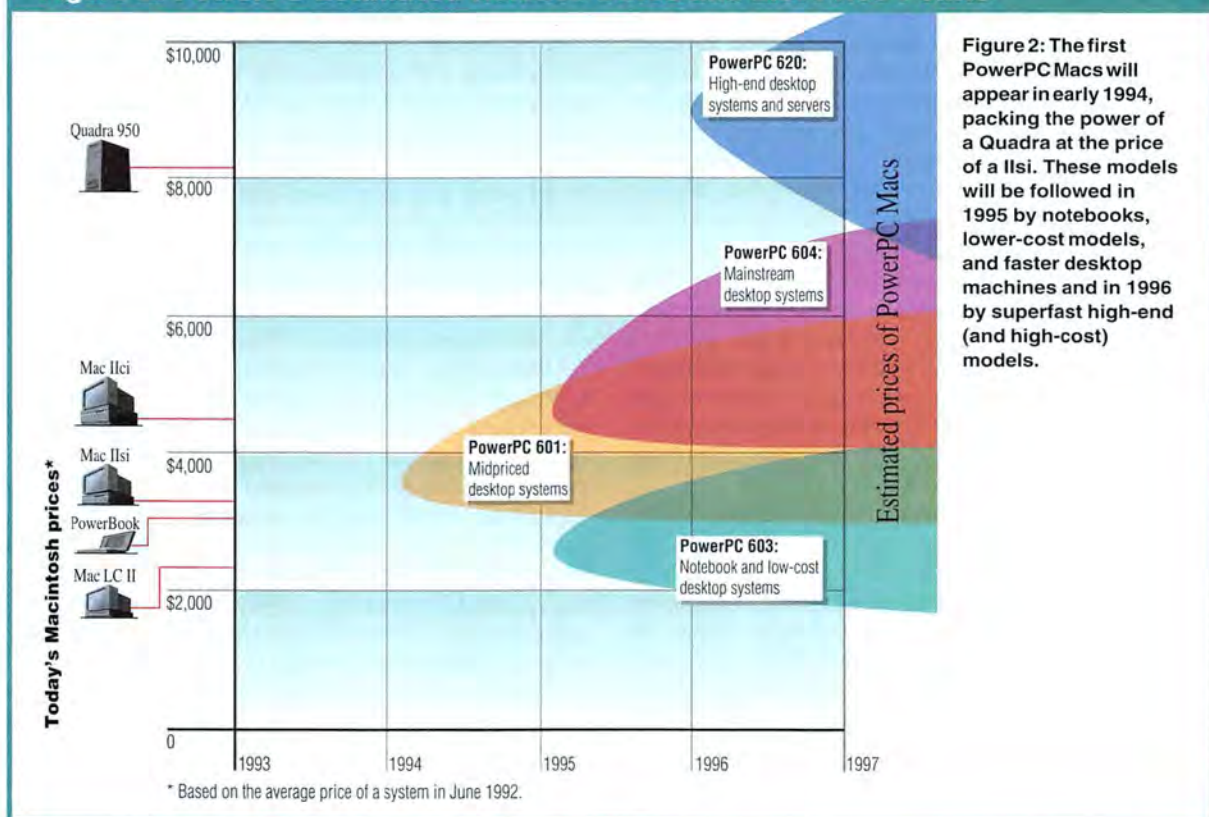
But Apple is planning to do far more with System 7 than merely port it to the PowerPC. It's going to make some changes in the basic architecture of the Mac's operating

system. Notice I said "architecture," not "interface." The latter will evolve too, of course, but Apple's talking about something different.

That something is called a microkernel, a small piece of

Support for pen input
would let you use
your Mac in
situations where
you couldn't use
a keyboard and
could dramatically
change the way
artists approach
a computer.

Figure 2: PowerPC Estimated Release Dates and List-Price Points





system software, customized for a specific microprocessor, that performs very basic system tasks. The rest of System 7 will be built on top of the microkernel. This system rewrite will enable Apple to implement some changes in the Mac OS that are long overdue. Here are the highlights:

- **Preemptive multitasking.** A basic feature of UNIX, preemptive multitasking defines how applications running at the same time share access to a computer's processor. It works by giving each task (or program) a turn, in a kind of round-robin arrangement. Benefit: Background processes run much more smoothly. Say goodbye to programs behaving like PrintMonitor, which is supposed to be unobtrusive but which often takes over control of your computer for several seconds, leaving you frantically clicking on windows, menus — anything to reassert your authority — wondering if you've crashed.

- **Multithreading.** Different parts of an application or system process will be able to run simultaneously. You will, for example, be able to start copying a file from the Finder and, without waiting for the copy to finish, open folders and launch applications, also from the Finder.

- **Protected memory.** When's the last time this happened to you? Your Mac crashed. I'm not talking about the graceful kind of crash, in which an application bites the dust and you return to the Finder. I'm talking about the reboot-and-take-a-coffee-break type of crash. With protected memory, if one application crashes, your other

applications and your system will keep on ticking. This, however, will work only with programs that are written to be microkernel-aware.

- **New I/O subsystem.** Look forward to much speedier hard-drive response, thanks to better management of data transfer to and from mass-storage devices. Photoshop will love this one. So will file servers.

- **Interprocess messaging and shared libraries.** These will make possible instant extensibility of the system as well as of applications. Think of it as plug-in heaven. But these capabilities will go beyond what you can achieve today with plug-ins. They will encourage developers to move away from everything-but-the-kitchen-sink applications and go toward small, highly efficient single-function apps that users can string together to create customized work environments.

Of course, there's a catch — maybe even two or three. Application vendors will have to rewrite their programs to take advantage of the new services provided by the microkernel. And although Apple is expecting to be able to provide a special translator (see

the "Old Apps, New Tricks" sidebar) to help vendors produce applications that take full advantage of the PowerPC's processing muscle, that unfortunately won't move applications an inch closer to benefitting from the microkernel.

And although Apple may get the microkernel-based version of System 7 running on 680x0 Macs even before PowerPC makes the scene, the first PowerPC Macs will probably ship with a nonmicrokernel system. Apple hasn't yet decided whether it will make the microkernel-based System 7 available on 680x0 Macs first or wait and release it on PowerPC Macs simultaneously.

In any case, the services the microkernel will make possible will appear slowly over time.

The Bottom Line

Apple's going to have some really, really fast Macs, starting in 1994. PowerPC will provide the Mac with a dramatic increase in processing power, without a corresponding increase in price.

A lot of effort is going into ensuring compatibility between the two types of Macs and between the systems that run on them. In particular, Apple is working hard to guarantee that today's applications will run on the PowerPC machines. Meanwhile, engineers are figuring out how to use the increased processing power of the PowerPC chips for exciting new technologies such as handwriting recognition, voice recognition, intelligent agents, and a

Future Macs

few things it's still too early to drop hints about.

Expect a few bumps in the road during the transition period. But expect Macs in 1994 and beyond to be far better machines than they have ever been before. And just

maybe you'll be able to spend more time working and less time waiting. ☺

As *MacUser's* technical director, Henry Bortman is first in line for a PowerPC.

Old Apps, New Tricks

Mac programs are usually written in programming languages such as C or Pascal and are then *compiled* to run on 680x0 processors. This compiling process converts the C or Pascal code a programmer has written, turning it into *native* instructions that 680x0 processors can understand. The problem in moving an application from 680x0-based Macs to PowerPC-based Macs is that native 680x0 instructions will look like gibberish to PowerPC processors. For today's apps to run on a PowerPC, their 680x0 native code will need to be converted to PowerPC native code.

Normally, this *porting* process — converting an application that runs on one type of processor to run on another — involves recompiling the original C or Pascal code with a compiler that's designed to generate native code for the new processor. Although that sounds simple, it can be an arduous and time-consuming task.

Apple hopes to alleviate some of the pain by providing a 68020 emulator on its PowerPC Macs. With the emulator, today's Mac applications will think they are running on a Mac with a 68020 processor. But in reality, the emulated 68020 will be a software program running on the PowerPC processor. And because the PowerPC chip will have to do the processing for both the emulation program and the original application, programs that run in emulation mode will run more slowly than those that run in native-PowerPC mode.

So, great, first Apple says you'll be able to get Quadra performance for the price of an LC, and then it says you're going to lose the performance in the emulator. This is exciting?

There's more to it. On a Mac, applications spend a lot of time invoking a set of operating-system routines known collectively as the Macintosh Toolbox. The Toolbox handles such things as displaying text, drawing the rectangles that comprise Mac windows, and erasing parts of the screen and redrawing them.

Although there are thousands of such routines, it turns out that most applications spend most of their time calling a relatively small subset of them. Although Apple will initially use the emulator to run most of System 7 on PowerPC Macs, it will convert these most common Toolbox routines to run in native PowerPC mode, without going through the emulator. So emulated apps will really be "enhanced" emulated apps.

But all this is a worst-case scenario. Apple is working with a company, Echo Logic, that has a special translator, FlashPort, that can convert applications directly from native-680x0 to native-PowerPC code, without requiring the time and effort of recompilation. The resulting programs have identical functionality and behavior to the originals but can take full advantage of PowerPC performance. Hopefully, Apple and Echo Logic will make this process cost-effective enough to enable even small companies to utilize it.

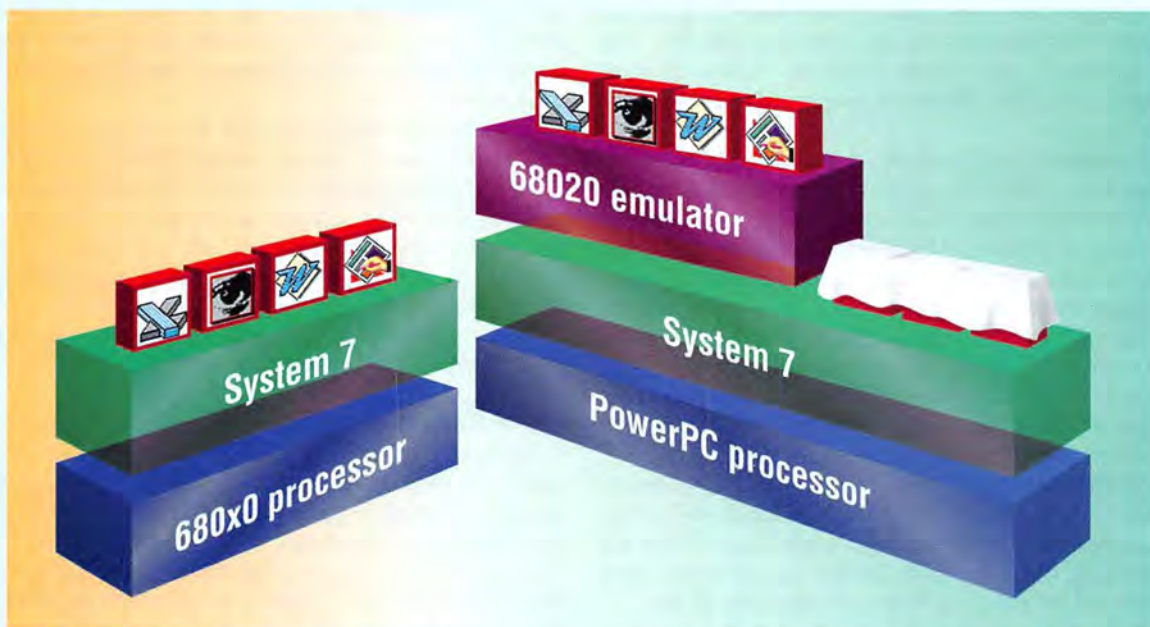


Figure A: Today's applications are written to run on 680x0-based Macs. These same applications will run, unmodified, on PowerPC Macs, whose system software will include a software emulation of a 68020-based Mac. Their performance will be equivalent to their performance on today's Macs. In addition, old applications converted to run directly on PowerPC Macs or new ones written from scratch for the PowerPC Macs will get a significant performance boost from the new processors.



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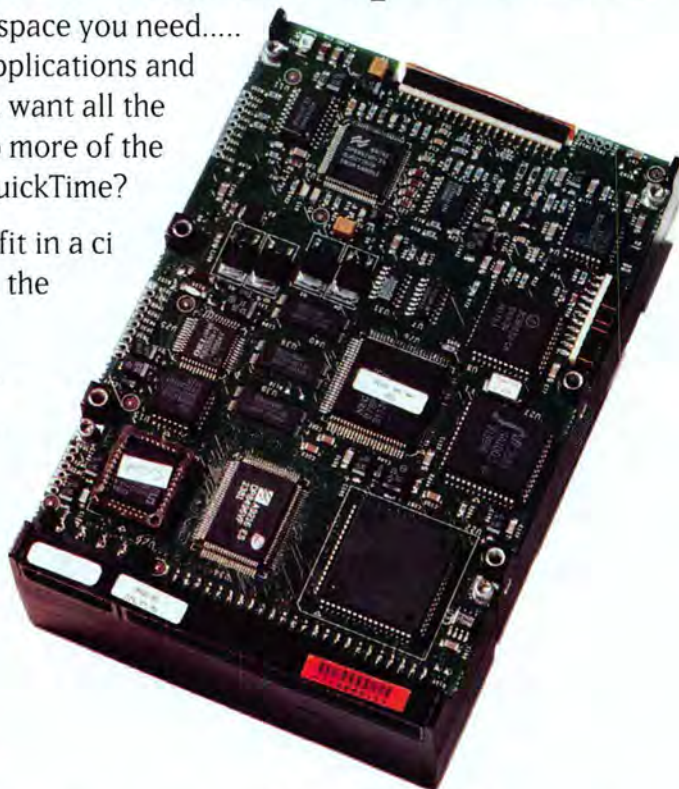
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The LC, the si and the Classic II are all great "little" machines. These Macs work great at home and have boosted efficiency in the office, but, until now, you could only get 100 megabytes inside.

APS introduces the 7213—the new, very fast, very quiet 200 MB hard drive from Maxtor. Best of all, you can put it inside your LC, si or Classic II!

The New Maxtor 7213

- Maxtor's 7213 not only provides you with over 200 MBs of storage, but it fits internally in the Mac LC, LCII, si, and Classic II. And, of course, it fits in most of the other Macs too.
- The 7213 is very fast—an average seek time of 15 ms and a data transfer rate of 1.8 MB/sec.
- The 7213 is very quiet—only 35 dBA in idle (spinning) on-track mode with an operating vibration of only 1G.
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The MacUser

SHAREWARE

Awards

Shareware can tune up your Mac, empower your programs, and — most important — save you big bucks. Here are the 34 top shareware bargains, as selected by a panel of industry experts.

BY GREGORY WASSON

Shareware seldom gets a fair shake. When the time comes to pass out awards, the more high-profile commercial products usually get all the glory. But shareware products often deliver a substantial portion of the functions and features that their commercial cousins do — at a fraction of the price. Most people could save hundreds of dollars by substituting just one or two top-notch shareware programs for commercial programs loaded with features they'll never use.

To give these incredible bargains their own moment in the spotlight, we sent ballots to more than a hundred movers and shakers in the Mac community, ranging from company CEOs to the industry's best writers, editors, tech-support managers, and others. We asked them to nominate their favorite shareware and freeware in a dozen categories (see the sidebars for some of their specific comments).

We tallied the votes, and here are the results: the very best in Mac shareware and freeware and a tribute to the talented Mac enthusiasts who bring these programs to life. Each program description includes the filename and the library in which you can find the files in the ZiffNet/Mac (Zmac) Download & Support Forum.



System Enhancements

This category produced more nominees than any other. This isn't surprising, because system enhancements are the most popular type of shareware for the Mac. Their popularity might seem a little odd, given that the Mac is known for its technically superior operating system. These programs

prove that even a very good thing can sometimes still be improved.

And the winner is . . .

SuperClock. SuperClock is a well-mannered, intelligent screen clock (see Figure 1). It is always visible in the right corner of the menu bar, unless a screen saver is in operation. PowerBook users will appreciate the program's new battery-power indicator. Author: Steve Christensen. Freeware; 18K (SUPERC.SIT, Library 3).

Honorable mentions go to . . .

PopChar. PopChar is a control-panel substitute for the Apple Key Caps DA. Author: Gunther

Blaschek. Freeware; 52K (POPCHA.SIT, Library 3).

Boomerang. Boomerang adds a pop-up menu that contains your most recently opened folders and files to the standard file dialog box. It lets you jump instantly to a folder or open a file. Author: Hiroaki Yamamoto. Shareware, \$30; 60K (BMR202.SIT, Library 3).

General Utilities

This category also pulled in many nominees: People love to tinker with their Macs, increasing the system heap, managing SCSI devices, and so on.

And the winner is . . .

SCSI Probe. SCSI Probe is a control panel that tells you what devices at a particular address are attached to your SCSI port and lets you mount off-line volumes. Author: Robert Polic. Freeware; 30K (SCSIPR.SIT, Library 3).

Honorable mentions go to . . .

Bootman. Bootman provides a simple, elegant way to increase your system heap and the number of files you can have open. Author: Bill Steinberg. Freeware; 16K

Adam C. Engst

Editor and Publisher, *TidBITS*
AppSizer. Michael Peirce's AppSizer lets you resize the memory partition for an application on launch and optionally save that size as the default (APPSIZ.SIT, Library 3).

TrashMan. I don't take my trash to the dump, and I don't want to have to empty my Mac's trash can either. TrashMan tracks how long a file has been in the trash and destroys it after a user-specified amount of time (TRAMAN.CPT, Library 3).

Carpetbag. Suitcase for the poor. Carpetbag simply opens resource files (fonts, Fkeys, and so on) in a folder as though they were stored in the System file (CARPET.CPT, Library 3).

Remember? An excellent date-reminder program that's competitive even with some recent commercial releases (REMDA.SEA, Library 2).

Downline. Takes the files stored in a user-specified folder, deBinxes and unStuffs them, and then puts the output into another user-specified folder. The easiest way to handle a bunch of downloads in succession (DOWNLI.CPT, Library 1).

(BOOTMN.SIT, Library 1).

TattleTale. TattleTale provides complete information about your computer's configuration. Author: John Mancino.

Freeware; 114K (TATAPP.SEA, Library 1). (This version of TattleTale is designed for System 7; the comparable application for users of other system-software versions is TattleTale DA [TATTLE.SEA, Library 2].)

Text Tools

When using your word processor is overkill or when you need

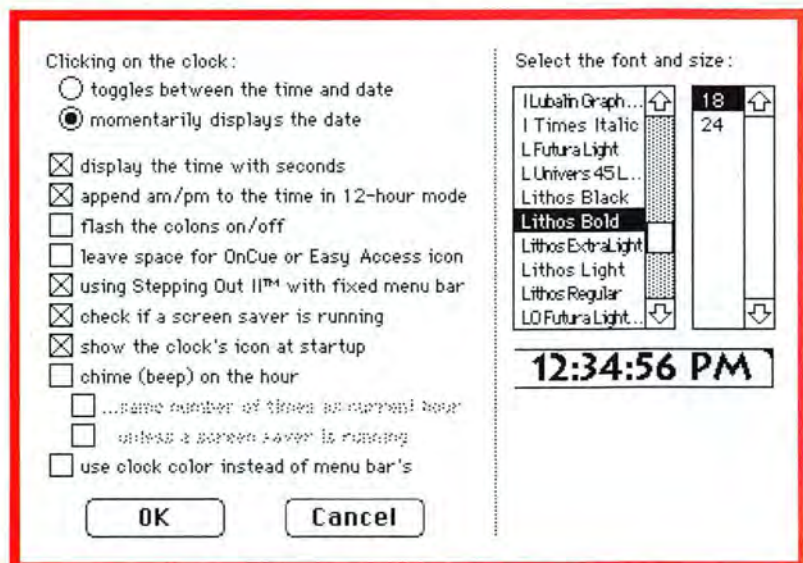


Figure 1: SuperClock is the best of the many utilities that can put the time of day — and other useful information — on your menu bar.



Shareware

different features, a variety of shareware text tools stands at the ready.



And the winner is . . . **McSink**. With its multiple windows, advanced controls, macros, color, and icon-grabbing capabilities, McSink is much more than an ordinary DA word processor/text editor. The program can be upgraded to Vantage, a commercial version of the product, available from Baseline. Author: David McWherter. Shareware, \$45; 116K (MCSINK.SIT, Library 2).

Honorable mentions go to . . . **DOCMAKER**. DOCMAKER lets you create stand-alone, self-running document files that can run on any Mac. You can use the files to distribute documents without knowing what word processor each recipient has. Author: Mark Wall. Shareware, \$25; 170K (DOCMAC.SEA, Library 1).

miniWriter. A useful text editor that never seems to fail, miniWriter is one of the most popular pieces of Mac shareware ever. Author: David Dunham. Shareware, \$12; 30K (MINIWR.SIT, Library 2).

DTP/Font Tools

The DTP arena hasn't produced a tremendous number of shareware products, but the ones that do exist are top-notch. The winner was chosen by an overwhelming number of the people balloted.

And the winner is . . . **theTypeBook**. This program is a utility that helps you create and maintain a typeface reference book that demonstrates the various artistic attributes of each face on a printed page. TrueType-compatible. Author: Jim Lewis. Freeware, 102K (TYPEBK.SEA, Library 1).

Honorable mentions go to . . . **Add/Strip**. Add/Strip automatically performs much of the work necessary to clean up text-only files destined for import into page-



layout, word-processing, database, or spreadsheet programs. It lets you substitute or remove em dashes, smart quotes, and so on, all in one pass. Author: Jon Wind. Shareware, \$25; 95K (ADDSTR.SIT, Library 1).

Carpetbag. Carpetbag is a shareware clone of Suitcase. It's not as powerful, but it's much

Alex Lau

Technical Support Manager, FWB, Inc.

CheckList. Included with PageMaker 4.2, it's a great tool for getting information essential for sending a job out to print at a service bureau (CHKLST.SEA, Library 1).

Helium. The first, and best, Balloon Help tool available (HELIUM.SIT, Library 3).

StuffIt Expander. The decompression tool that should have been available from the get-go. In System 7, its drag-and-drop ability is key and earns it precious space on my desktop (STUFEX.SEA, Library 1).

cheaper. Author: James Walker. Shareware, \$5; 35K (CARPET.CPT, Library 3).

Graphic Tools

If you're a budding painter, you can draw and paint yourself into a corner with any of the nominees in this category.

And the winner is . . .

LightningPaint. LightningPaint is a remarkable painting-type graphics program. It sports all the usual painting tools and even some unusual ones, such as spiral and starburst tools (see Figure 2).

LightningPaint saves files in its own format or in MacPaint, startup-screen, or PICT format. Requires Compact Pro (see later). Author: Humayun S. Lari. Shareware, \$14 (\$7 for students); 160K (LPAINT.CPT, Library 1).

Honorable mention goes to . . .

AppleDraw. An older piece of software, this drawing program in a DA provides most of the features casual users will ever need. Author: Gunther Blaschek. Freeware, 32K (APDRAW.CPT, Library 2).

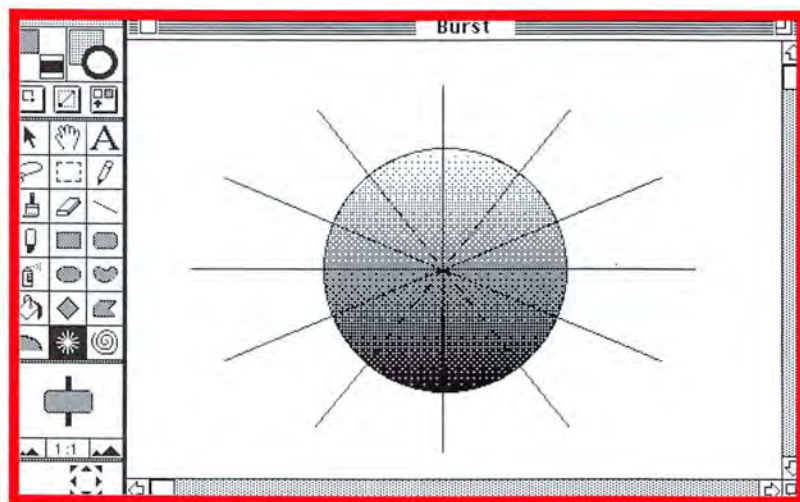


Figure 2: LightningPaint provides a full-featured black-and-white painting program for \$14.



Personal Information Managers/Number Crunching

Taking care of business doesn't necessarily require a corporate bankroll. The programs honored in this category help keep you organized and in the black.

And the winners are...

Remember? Remember? is a personal reminder system composed of a DA and a system extension (INIT) that lets you set alarms to notify you of upcoming events, deadlines, and the like. Author: Dave Warker. Shareware, \$20; 150K (REMDA.SEA, Library 2). (The documentation, if you need it, is available as the file REMDOC.SEA.)

BiPlane. BiPlane, the "affordable shareware spreadsheet," is a full-featured business tool (see Figure 3). Features include SYLK-file compatibility with Microsoft Excel, 512 columns by 16,384 rows, 102 functions, and business graphics. When you become a registered user, you get a DA version, Help files, and a 200-page manual. Author: Alan Porter. Shareware, \$59; 177K (BIPLAN.SEA, Library 1).

Honorable mentions go to...

Address Book. This is an

address-book application and DA. Address

Book prints to envelopes; labels; Rolodex cards; and size B, D, J, and K Day-Timers. Author: Jim Leitch. Shareware, \$30; 194K (ADDRBK.SEA, Library 1).

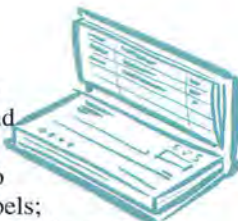
To Do! The To Do! DA is an attractive, well-designed program for keeping track of your daily activities. It's easy to use and very handy. Author: Andrew Welch. Shareware, \$15; 68K (TODO.SEA, Library 2).

System 7 Only

System 7 may be heaven, but there are ways to tweak it, as the programs honored in this category make abundantly clear.

And the winner is...

MODE32. MODE32 is a System 7 extension that enables Mac II, IIfx, IIfx, and SE/30 computers to use 32-bit addressing and access more than 8 megabytes of real or virtual memory. Developed by Connectix and made available through a blanket distribution agreement with Apple, MODE32 is free — kudos to both Apple and Connectix for this generous gift to the Macintosh



Mike Farmer

President, Survivor Software Ltd.

MenuChoice. Almost as good as the commercial menu-enhancement utilities such as HAM and Now Menus. A real lifesaver on my PowerBook (MENUCH.SEA, Library 3).

Disinfectant. The most recommended antiviral tool. Super support and timely updates (the same is true of VirusDetective). It has saved us a few times (DISINF.SIT, Library 8).

StuffIt Classic. Even though we now use the commercial version as well, we still use this utility a lot. We do use others, but StuffIt has proven to be the most reliable (STUFCL.BIN, Library 1).

community. Author: Connectix. Freeware; 40K (MODE32.SEA, Library 3).

Honorable mentions go to...

ZMakeAlias. ZMakeAlias puts a Make Alias option inside the Save and Save As dialog boxes for all applications. Author: Mike Throckmorton. A ZiffNet/Mac exclusive. Freeware; 45K (ZMAKEA.SIT, Library 3).

MenuChoice. MenuChoice is a control panel that makes folders in your Apple Menu Items folder show up as submenus on the Apple menu. Author: Kerry Clendinning. Shareware, \$15; 50K (MENUCH.SEA, Library 3).

Security/Antiviral Tools

Protecting your data from prying eyes and malicious viruses is an unfortunate necessity. There was no real contest in this category — the winner garnered more votes than any program nominated in any category.

And the winner is...

Disinfectant. Disinfectant is



Sales Figures				
January				
	A	B	C	D
108				
109				
110	Southwest Sales District Forecast			
111		1991 Sales	1992 Sales	1993 Sales
112	January	1000	2000	3500
113	February	1300	2300	3800
114	March	1600	2600	4100
115	April	1900	2900	4400
116	May	2200	3200	4700
117	June	2500	3500	5000
118	July	2800	3800	5300
119	August	3100	4100	5600
120	September	3400	4400	5900
121	October	3700	4700	6200
122	November	4000	5000	6500
123	December	4300	5300	6800

Figure 3: BiPlane is a \$59 shareware spreadsheet program that includes more features than most people ever use in its commercial competitors.

Shareware

a free virus-prevention and disk-scanning and -repair program (see Figure 4). Version 2.8 includes a new protection INIT and excellent built-in documentation and can detect the latest Mac viruses: MBDF A, INIT1984, and Code 252. The author should be canonized for providing this program to the Mac community. Author: John Norstad. Freeware; 204K

(DISINF.SIT, Library 8).

Honorable mention goes to . . .

VirusDetective.

VirusDetective is an outstanding user-configurable antiviral system. It scans floppies, creates logs, and does much more. Help is built in. Author: Jeff Shulman. Shareware, \$40; 164K (VIRDET.SEA, Library 8).

Telecommunications/Compression

Shrieking and shrinking might be a good subtitle for this category. The winners should come as no big surprise.

And the winners are. . .

ZTerm. ZTerm is a fast, efficient telecommunications program that's not overloaded with

features. It can store settings, phone numbers, and simple macros. ZTerm supports Zmodem, Xmodem, Ymodem, and CompuServe's QuickB scheme, so you don't have to switch applications to use older protocols. Author: David Alverson. Shareware, \$30; 186K (ZTERM.CPT, Library 1).

Compact Pro. Compact Pro is a file-compression utility that allows you to shrink files so they take up less disk space. Files compressed by Compact Pro are typically smaller than those compressed by StuffIt 1.5.1. You can also create auto-extracting archives to send to someone who doesn't have Compact Pro. Author: Bill Goodman. Shareware, \$25; 120K (CPTPRO.SEA, Library 1).

Honorable mentions go to . . .

StuffIt Classic Installer. This self-extracting archive installs StuffIt Classic, the shareware version of StuffIt Deluxe. Author: Raymond Lau.

Shareware, \$25; 378K (STUFCL.BIN, Library 1).

StuffIt Expander. StuffIt Expander is a must-have *free*

Mike O'Connor

Author of the CompuServe Navigator program

TattleTale. I like TattleTale best, probably because I'm a Mac developer. It has the most useful information about what is installed on your system (TATAPP.SEA, Library 1).

DOCMaker. I like DOCMaker because with it you don't have to worry that others can't read your important documents, even if you don't know what text editors they have (DOCMAK.SEA, Library 1).

UnZip. I recommend the version with the extra command that automatically sets the proper Mac Type and Creator codes on the files it expands — I wrote that added command but not the rest of the program (UNZIP.SIT, Library 1).

compression utility that decompresses files from any of the StuffIt formats as well as files from Compact Pro and AppleLink packages. Author: Aladdin Systems. Freeware; 71K (STUFEX.SEA, Library 1).

Connectivity

With Apple and IBM cozying up to one another, having the right connections is definitely a plus. Being able to "talk" the other platform's lingo or move files through different formats is a must, and the honorees in this category make that a whole lot easier.

And the winner is . . .

GIFConverter. This program lets you view GIF, TIFF, RIFF, RLE, PICT, startup-screen, paint, or ThunderScan files on any Mac. GIFConverter also allows you to save files to any of these formats or to EPS or print them to any Mac printer. It's a great connectivity tool. Author: Kevin

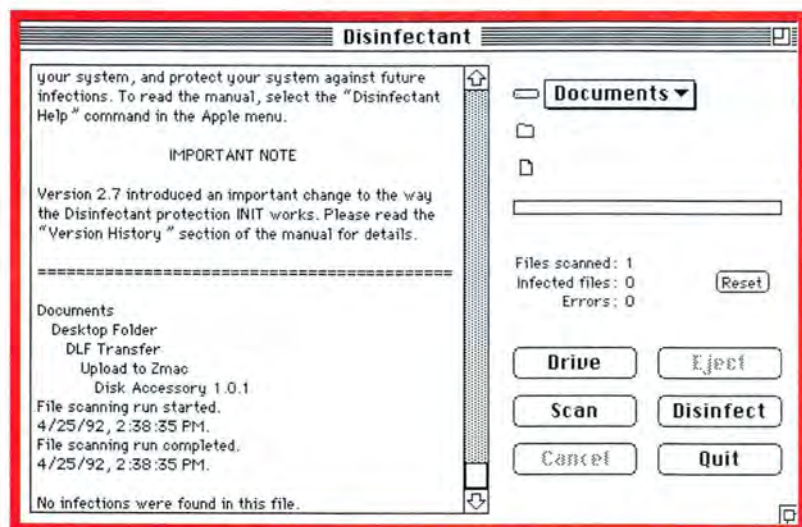


Figure 4: Disinfectant gives you peace of mind about viral infections — and it's free.



Mitchell. Shareware, \$40; 295K (GIFCON.CPT, Library 1).

Honorable mention goes to . . .

UnZip. UnZip lets Mac users de-archive Zip files, allowing access to material compressed in the DOS world's equivalent of StuffIt. Authors: Samuel Smith and others. Freeware; 40K (UNZIP.SIT, Library 1).

Children's/Educational

Children and monks may not seem to go together, but they both showed up on our voters' list of favorite children's or educational shareware programs.

And the winner is . . .

Kid Pix. Kid Pix 1.0 is the free version of the popular children's painting program (see Figure 5). It doesn't have all the bells and whistles of the commercial version (no color, not as many wacky brushes, and no digitized sounds), but it's still wildly fun and fully functional. An enhanced color version is available from the author for \$25. Author: Craig Hickman. Freeware; 44K (KIDPIX.CPT, Library 1).

Honorable mention goes to . . .



If Monks Had Macs . . .

If Monks Had Macs, a collection of several stacks, is one of the most beautiful and elaborate works in HyperCard. The stacks range from a medieval religious work to messages on a contemporary bulletin board on the meaning of life. The entire collection is too large to provide for downloading, but ZiffNet/Mac has four sample stacks in Library 6: The White Rose (MONKS1.SIT); Passing Notes (MONKS2.SIT); Haiku Master (MONKS3.SIT); and Meat & Conversation, which is actually a delightful adventure game (MONKS4.SIT). Each stack includes instructions on ordering the entire collection. Authors: Philip Mohr and Brian Thomas. Freeware.

Trivial Pursuits

All work and no play would make even our extremely likable balloters dull boys and girls.

And the winner is . . .

Klondike. Klondike is a straightforward simulation of real solitaire, which may not sound like much to get excited about unless you're very, very lonely, but this is an elegantly designed program.

Steven Bobker

Contributing Editor, *MacUser*
CursorFixer. Makes my PowerBook cursors more visible and useful (CURFIX.CPT, Library 3).

MICN. Places icons instead of names on the menu bar (even in Microsoft products), thereby reducing menu-bar clutter (MICN.CPT, Library 3).

LightningPaint. A commercial-quality black-and-white painting program — the biggest bargain in all of shareware (LPAINT.CPT, Library 1).

BiPlane. A great spreadsheet program with power and slickness that some commercial products can only envy. (BIPLAN.SEA, Library 1).

VirusDetective. The best Macintosh antiviral tool, bar none. (VIRDET.SEA, Library 8).

You even get color suits on the Mac II. It's a classic. Author: Michael Casteel. Shareware, \$10; 50K (KLONDI.SIT, Library 1).

Honorable mentions go to . . .

Solarian II. A high-quality color arcade game set in an outer-space environment where you're attacked by a zoo of interesting characters. Author: Ben Haller. Shareware, \$25; 528K (SOLARI.SEA, Library 1).

Pacman. This version of Pacman is the best we've seen. It's vivid and colorful and brings back great memories of the arcade video-game classic. Requires a 13-inch Apple color monitor set to 256-color mode. Author: M. Tsuji. Freeware; 26K (PACMAN.CPT, Library 1).

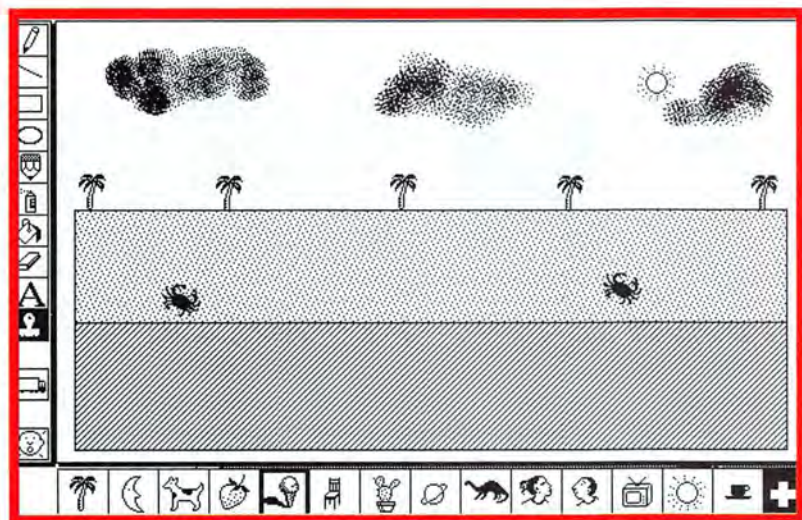


Figure 5: The free black-and-white version of Kid Pix still packs plenty of fun, and a color upgrade costs only \$25.

Gregory Wasson is the chief sysop for ZiffNet/Mac's Download & Support Forum and is writing a book about Macintosh shareware and freeware for ZD Press.

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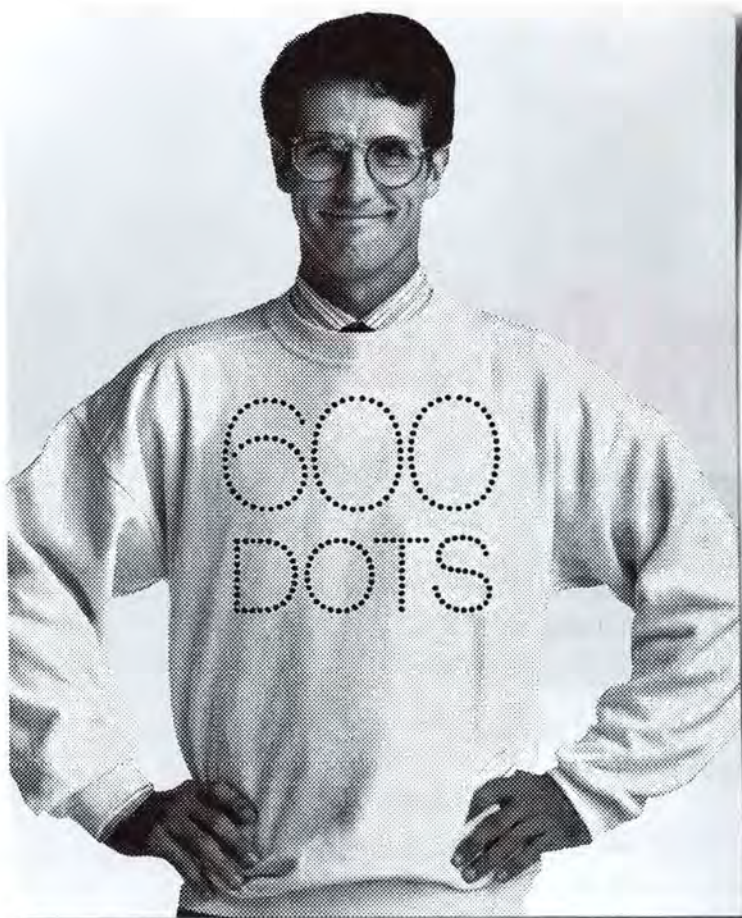
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PostScript Printing

That Won't Break the Bank

Can the average small-business user afford

PostScript compatibility?

We test 21 printers that say yes.

BY BRUCE FRASER

Personal PostScript printing was once reserved for big-wigs in big companies with big budgets. In most offices, a PostScript printer was a shared resource. Like the office photocopier, one printer was shared by an entire workgroup, and you walked a mile for your printouts. Today, as the price of PostScript plummets, printers are more like typewriters than like photocopiers — they're becoming part of each office worker's standard arsenal: desk, chair, computer, wastebasket, printer. Even if your company's budget is limited, you can now afford to put a PostScript printer onto your own desk without bringing on bankruptcy.

To help you make this move toward personal productivity, MacUser Labs tested 21 personal PostScript printers for speed, image quality, and ease of use. Each printer costs less than \$3,000. Each offers a resolution of at least 300 dpi. Each is suitable for use by an individual or by a workgroup of ten people or fewer. Each produces monochrome images acceptable for day-to-day business documents.



If you require higher-quality output — for desktop publishing, for example — we recommend that you use a high-resolution printer (see “Practically Perfect Printing: High-Resolution PostScript Printers,” February ’92, page 172). If you need your printer to run all day, every day, churning out reams of reports and correspondence, buy a heavy-duty workgroup printer (see “Getting Down to Business: Workgroup Printers,” September ’91, page 128). But if you need fewer than 20,000 PostScript-quality pages each month, wait no longer.

Smart Printing

All PostScript-compatible printers — whether they’re high-resolution, workgroup, or personal — include an *interpreter*, which is a combination of

hardware and software that creates a printable image from information sent by the Mac. The printer’s internal microprocessor manages this imaging process, so your Mac is free to do other work while the printer *RIPs* (raster-image-processes) the page. By contrast, *QuickDraw* printers have no interpreters or microprocessors; they rely on the QuickDraw driver in the Mac and the Mac’s microprocessor to RIP the image, tying up the Mac during printing.

Many of the printers we tested use a *RISC* (reduced-instruction-set computing) processor (see Table 1). RISC processors use simpler low-level instructions than do *CISC* (complex-instruction-set computing) processors such as the Motorola 68000-series processors found in many printers and in

your Mac. RISC processors are faster as a result.

Most of the printers we tested use PostScript interpreters licensed from Adobe, earning them the name *true Adobe PostScript* printers. The others — the Bézier BP4040, Brother HL-4PS, Everex LaserScript LX, and NewGen Personal Series Turbo PS/300P and PS/400P — use non-Adobe interpreters that are compatible with the PostScript page-description language. They’re known as *PostScript-clone* printers. What’s the difference for users? We’ll get to that a little later.

Of the 16 true Adobe PostScript printers, 5 — the Dataproducts LZR 960, Hardware That Fits RealTech Laser, MacFriends QuicKor TS, NEC Silentwriter Model 95, and Texas Instruments microLaser Turbo — use Adobe’s new *PostScript Level 2* interpreter. We tested the Hewlett-Packard LaserJet IIIP with its optional PostScript Level 2 upgrade cartridge. The rest use Adobe’s PostScript Level 1 interpreter (see the “What Is This Level 2, Anyway?” sidebar).

We compared each printer’s performance with that of the familiar Apple Personal LaserWriter NT, a PostScript Level 1 printer. The results were clear: PostScript printers — those using Adobe PostScript as well as those using PostScript clones — are getting faster and less expensive. Almost all the printers we tested were significantly faster in all-around performance than the NT was (see Figure 1). By the time you read this, Apple will have phased out the venerable NT. Look for a report on its replacement, the Apple Personal LaserWriter NTR, in a future issue.

Who Are You?

No one personal printer is right for everyone. A model that cranks out letters with blazing speed might reduce the pie charts in your financial reports to ellipsoidal smudges. Another printer that produces clean, beautiful graphics might print your correspondence at a snail’s pace. Several

What Is This Level 2, Anyway?

PostScript Level 2 is Adobe’s first major rewrite of its PostScript page-description language. Level 2 incorporates various upgrades and extensions that have been developed to enhance Level 1’s performance. Level 2’s introduction has been surrounded by a certain amount of confusion, fueled in part by the lengthy wait for Level 2-aware printer drivers. Among the questions raised by the introduction of Level 2 printers are the following: What advantages does PostScript Level 2 bring? Will PostScript Level 2 make my Level 1 printer obsolete?

To deal with the second question first, the short answer is no. The longer and more equivocal answer is that for any page that can be described by PostScript Level 2, an equivalent page description can be created in PostScript Level 1: Your old documents can be printed on the new printers; your new documents can be printed on the old ones. On the negative side, the equivalent Level 1 page description may be less efficient and it may take longer to print.

What advantages does Level 2 offer? For monochrome printers such as those tested for this report, the gains lie in the future. At the moment, there are no applications or drivers that create PostScript Level 2 page descriptions, although a few applications are capable of using some Level 2 features. Some features will be exploited by the long-

promised new printer drivers from Adobe and Apple, which may be released shortly after this report appears.

For example, support for printer-specific features such as multiple paper trays is built in to Level 2, so you’ll be able to control these features without any special software from the vendor. Also, the new driver will know whether it’s printing to a Level 1 or a Level 2 printer and will generate the appropriate PostScript code for each. Adobe claims that users of Level 1 printers will also see a performance boost from the new driver, simply because it will generate more-efficient PostScript code.

We didn’t see increased prices for Level 2 among the printers we tested for this report — in fact, a few of the Level 1 printers cost more than the Level 2 printers did. However, Level 2 does bring with it one additional expense: the cost of more RAM. Although Level 2 boasts improved memory management, we found that the minimum amount of RAM required for printing complex documents is greater than in Level 1 — documents that printed to a 2-megabyte Level 1 printer needed more memory under Level 2. The fact that Apple has upped the minimum amount of RAM to 4 megabytes in its Level 2 printers, without increasing their prices, suggests that the long-awaited drivers from Adobe and Apple won’t change this situation. We recommend 4 megabytes of RAM in Level 2 printers.

Designated Drivers

Your Mac's operating system includes an *imaging model* called QuickDraw that ensures that what's on-screen will match what's printed. This one-to-one correspondence between screen and printer is called *WYSIWYG* (what you see is what you get).

From an application's point of view, drawing text and graphics on your Mac's screen is virtually identical to sending the same images to a printer. The basic difference is the size and shape of the area to which the application draws.

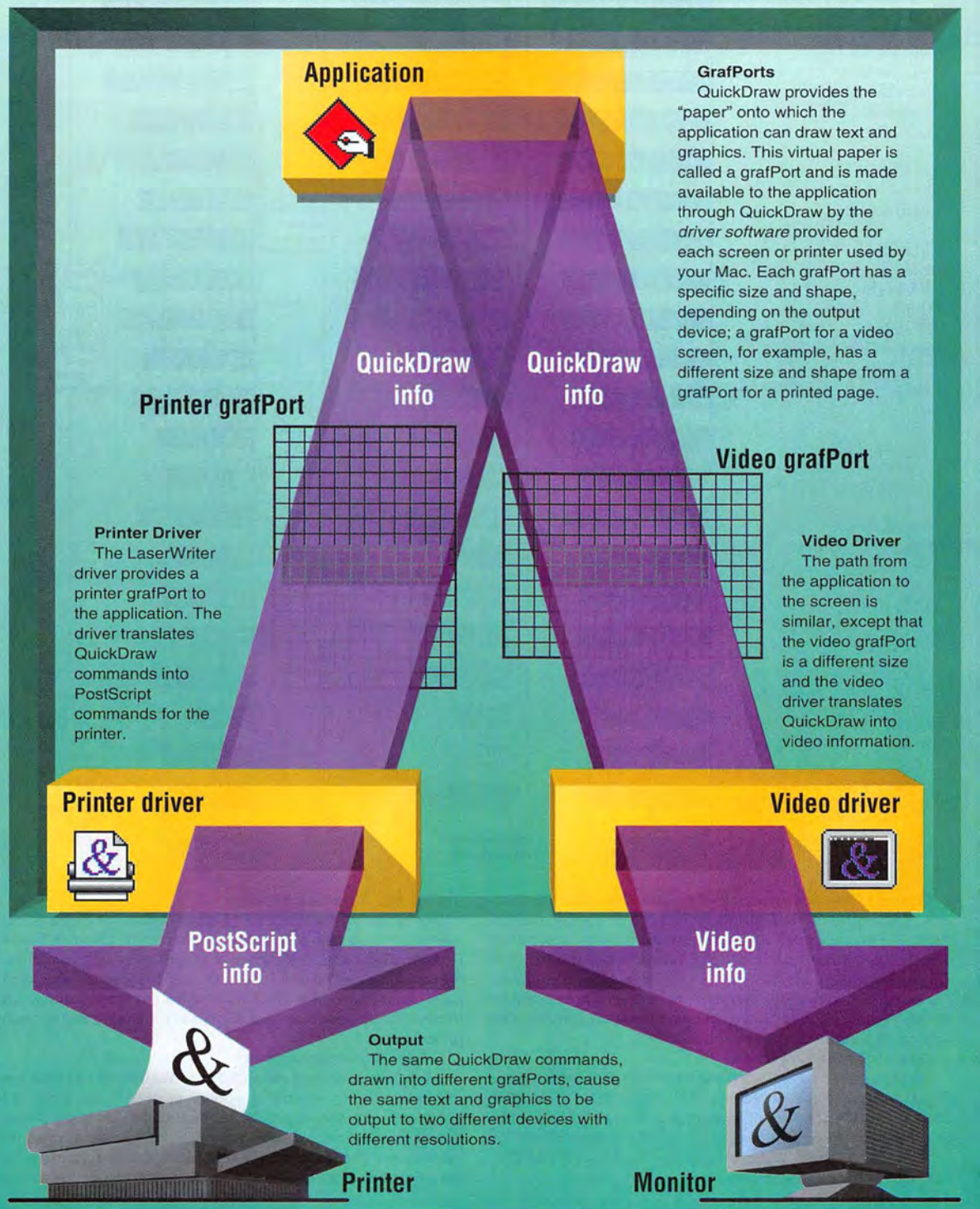


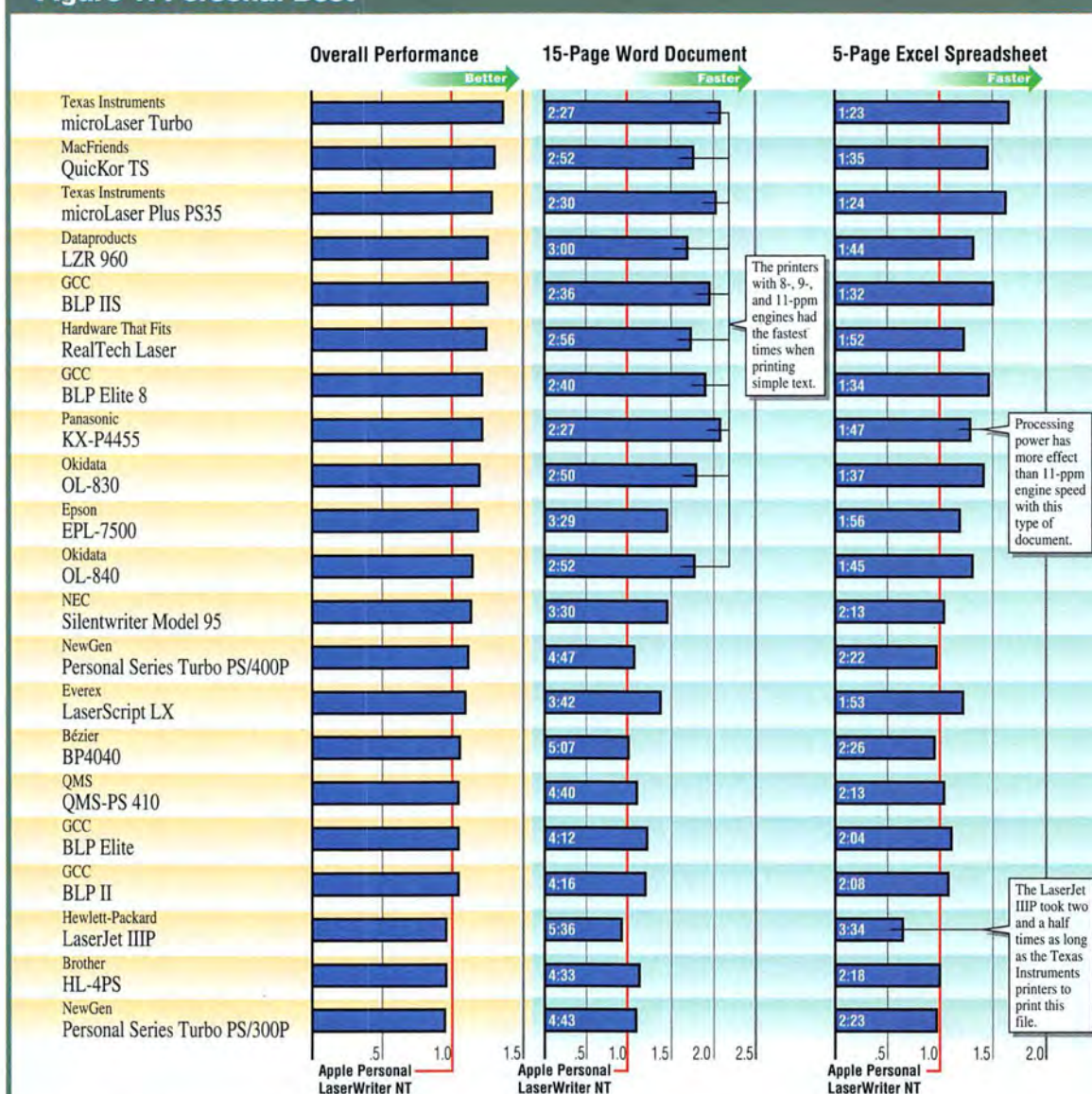
Figure 1: Personal Best


Figure 1: The performance of personal PostScript printers is a combination of printing speed and image quality. First, our lab technicians ran a suite of timed tests on the 21 PostScript printers and on our reference standard, the Apple Personal LaserWriter NT. Our expert jury then rated the output quality of all the printers. All bars in this figure show our results relative to those of the NT, which was assigned a score of 1.0 in each test.

Overall Performance:

To arrive at an overall ranking of the 21 printers, we gave equal weight to the subjective and objective scores. Because of its exceptional speed, the Texas Instruments microLaser Turbo came out on top. The MacFriends QuicKor TS edged out the Texas Instruments microLaser Plus PS35 in the race for second place.

15-Page Word Document:

Our technicians printed a 15-page Microsoft Word document that used a single printer-resident font: 12-point Times Roman. The Texas Instruments microLaser Turbo and the Panasonic KX-P4455 led the pack, and the Hewlett-Packard LaserJet IIIP turned in the slowest time. (Average print times in minutes and seconds are shown at the beginning of each printer's bar.)

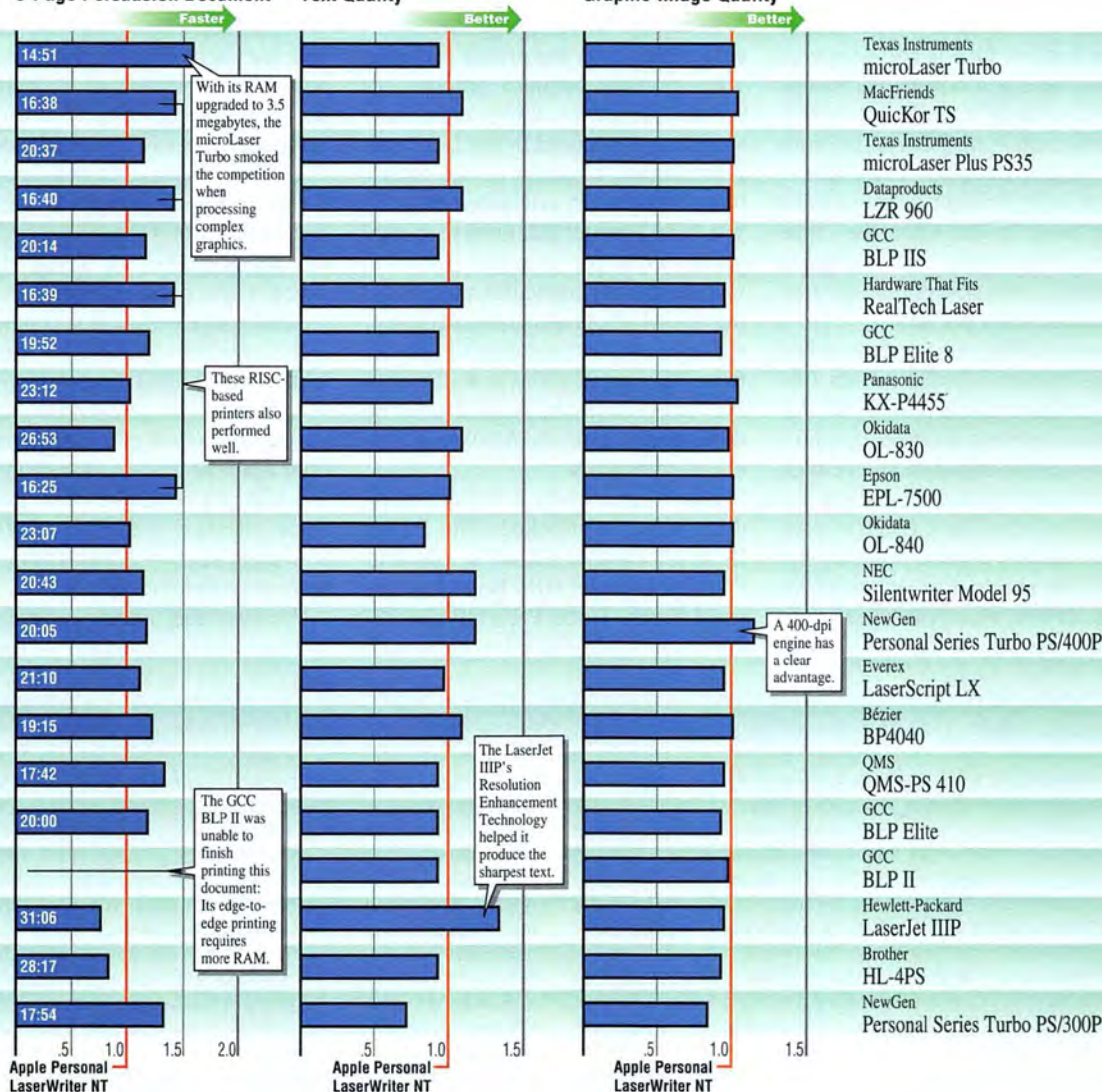
5-Page Excel Spreadsheet:

We printed a simple Excel 3.0 spreadsheet to see how the printers handled simple graphics elements such as cell borders and screened cells, tasks that call on processing power in addition to engine speed. The Texas Instruments microLaser Turbo again took first place, followed closely by the microLaser Plus PS35. The Hewlett-Packard LaserJet

5-Page Persuasion Document

Text Quality

Graphic-Image Quality



IIIP placed last. (Average print times in minutes and seconds are shown at the beginning of each printer's bar.)

5-Page Persuasion Document:

Our pièce de résistance: A five-page Persuasion document that included text in a variety of font formats plus placed PICT, gray-scale-TIFF, and EPS files pushed the printers' processors to their limit. One PostScript Level 1 printer, the GCC BLP II, was unable to finish the job (its unique — but memory-hungry — edge-to-edge-printing feature proved to be the culprit), and all the PostScript Level 2 printers required additional RAM. Once again, the Texas Instruments microLaser Turbo was the fastest. The next-fastest speed was turned in by the Epson EPL-7500, followed closely by three more RISC-based printers. The Hewlett-Packard LaserJet IIIP took more than half an hour to

print this document. (Average print times in minutes and seconds are shown at the beginning of each printer's bar.)

Text Quality:

Our jury scrutinized a variety of output samples from each printer, checking for smooth edges of large fonts and readability at small point sizes. The slow-going Hewlett-Packard LaserJet IIIP produced the cleanest text. The NewGen Personal Series Turbo PS/300P failed to impress.

Graphic-Image Quality:

The jury pored over graphics that included a gray-scale image, solid-black areas, and large reversed type, looking for the crispest output. The NewGen Personal Series Turbo PS/400P's 400-dpi output easily took first place, but its 300-dpi sibling, the NewGen Personal Series Turbo PS/300P, trailed the pack.

variables influence printer performance, and their relative importance varies, depending on the number and kind of documents you need to print.

Speed, for example, is a product of several factors. One is engine speed, which is measured in pages per minute (ppm). Another is processor speed, which is rated in megahertz (millions of cycles per second). Yet another is the type of PostScript interpreter the printer uses: In our tests, the clone printers, even those with fast-rated processors, were slower than the true Adobe PostScript printers.

If you work mostly with text and use the printer's *resident fonts* (the fonts contained in your printer's ROM) to print simple text documents, then a printer's engine speed should be high on your list of buying considerations.

If, on the other hand, much of your output contains graphics such as bar graphs, pie charts, line drawings, or gray-scale images, engine speed is an almost meaningless factor: Printers

never achieve anywhere near their rated engine speeds on such complex documents, because the engine has to wait for the printer's microprocessor.

In theory, the faster a printer's processor, the faster the printer performs when printing complex graphics. In practice, however, things aren't that simple, as evidenced by the lackluster performance of some of the RISC-based printers in our speed tests. If you need a printer that turns in speedy performance for complex graphics, you should pay particular attention to the results of our Persuasion-file test, which incorporates graphics imported from other applications as well as several *nonresident* fonts (which must be downloaded from the Mac) in a variety of point sizes.

Paper capacity is a consideration that's often overlooked. The Béziers BP4040, Brother HL-4PS, Hewlett-Packard LaserJet IIIP, NewGen Personal Series Turbo PS/300P and PS/400P, and QMS-PS 410 come with a

single multipurpose foldout paper tray capable of handling 50 sheets of 24-pound stock. Some manufacturers describe these as 70- or 75-sheet trays, but such capacity is the case only if you use lighter paper, such as 16-pound stock. Standard xerographic paper is 20-pound stock, and most letterhead paper is 24-pound stock.

These small paper trays may be sufficient for a single user producing short documents. But if you do a significant amount of printing or if you plan to share your personal printer in a multiuser office that cranks out lots of text, someone — probably the unlucky soul who sits nearest the printer — will get plenty of exercise refilling the paper tray. All of these printers do offer optional 250-sheet second trays at additional cost. The other printers come standard with 150-, 200-, or 250-sheet trays — a much more convenient configuration.

We found that loading consumables — toner, drum, developer — into the

How We Tested

To test these 21 personal PostScript printers, we created a suite of documents designed both to simulate a typical business user's requirements and to highlight various aspects of printer performance. We then used a stopwatch to time each printer's performance on each of the documents, from the time we clicked on the Print button to the time the last page landed in the tray — the "click to clunk" time, in printer-testing jargon.

To make sure our timing tests were consistent, we standardized several factors. We used Mac IIci's with 80-megabyte hard drives running System 7.0.1 installed with the Standard selection and revised with Tune-Up 1.0. We used Apple's LaserWriter driver 7.1 printer driver — except when testing the Béziers BP4040 and the Brother HL-4PS, which proved incompatible with the LaserWriter driver 7.1; for their testing, we substituted the previous driver, LaserWriter driver 7.0. We also made sure that the RAM-cache setting in the Memory control panel remained unchanged from test to test (we set it to 128K) — the cache size can make a significant difference in the performance of the printer driver and hence to printing speed.

Before we commenced testing, we printed a "break-in" page on each printer. This ensured that the printer was initialized (we had already sent the Apple PostScript dictionary to the printer) before we started our tests. We ran each test three times and took the average of the printing times. We then calculated our results relative to those of an Apple Personal LaserWriter NT, which was given a score of 1.0 on every speed test. These normalized scores (with the averaged print times superimposed on the bars) appear in Figure 1.

Our test suite consisted of a 15-page Microsoft Word document formatted in 12-point Times Roman, a printer-resident

font; a 5-page Microsoft Excel spreadsheet that contained some simple graphic elements such as cell borders and shaded cells; and a 5-page Aldus Persuasion document. This document contained type in both small and large sizes; PICT, EPS, and gray-scale-TIFF graphics; and downloadable fonts in both Adobe Type 1 and Apple TrueType formats. We also output the first page of the Persuasion file to 3M overhead transparencies to see how the printers handled this medium. All were able to print on it without jamming and without melting the material.

Finally, we used the Persuasion file to judge image quality. We used a "blind" jurying system, in which the print samples were identified to the jury only by number. We looked at five type samples per printer: 10-point type, 48-point type, 18-point reversed type, a gray-scale image, and a solid-black area. We then compared the image quality produced by each printer with that produced by an Apple Personal LaserWriter NT, assigning the latter a score of 1.0 for all the tests.

Here are some guidelines for testing printers yourself. First, make sure that the only variable in your test is the printer. It's important that you use an identical setup, in terms of both hardware and software, to drive each printer. Differences in the CPU, in hard-disk speed, and in system-software versions can make big differences to print times. Try to emulate your office setup as closely as possible, because that's the configuration you'll ultimately be using.

Second, create test documents that typify your actual use of the printer and try to include a good mix of text and graphics. Very often, a printer excels at printing one type of document but not another. By using a mix of different document types, you can obtain a good sense of a printer's overall capabilities.

printers was easy, except in the case of the Panasonic KX-P4455, which uses toner from a bottle — a potentially messy operation. The Epson EPL-7500, the NEC Silentwriter Model 95, and all the printers based on the Canon engine use a single cartridge containing the drum, the developer, and the toner. The others use separate drum, toner, and developer but are nonetheless easy to handle.

Are We Compatible Yet?

Your Mac's operating system provides a *printer driver* to convert QuickDraw information from the computer into PostScript for the printer (see the "Designated Drivers" sidebar). As Apple updates the Mac's operating system, the driver gets updated as well. For example, when we began testing these printers, we used the most current driver then available, which was LaserWriter driver 7.1, distributed with System 7 Tune-Up 1.0. (As this report went to press, LaserWriter

driver 7.1.1 had been announced.)

Two of the PostScript-clone printers — the B zier BP4040 and the Brother HL-4PS — could not print with LaserWriter driver 7.1, although they worked perfectly with the previous driver, 7.0. Another clone, the Everex LaserScript LX worked with LaserWriter driver 7.1 but not with the previous driver, 7.0. Given that Apple replaced the 7.0 driver with 7.1 rather quickly, it may be safe to conclude that the problem with the Everex printer was with Apple's driver and not with the printer. However, we were unable to get a definitive policy statement from Apple on whether it plans to accommodate PostScript clones when it delivers future printer drivers.

Thanks for the Memory

PostScript printers are equipped with RAM to accommodate the commands sent from the computer, the calculations performed by the interpreter, and the bit map created at the

last stage before printing. Each of the printers in this report ships with a standard configuration of 1.5 to 4 megabytes of RAM.

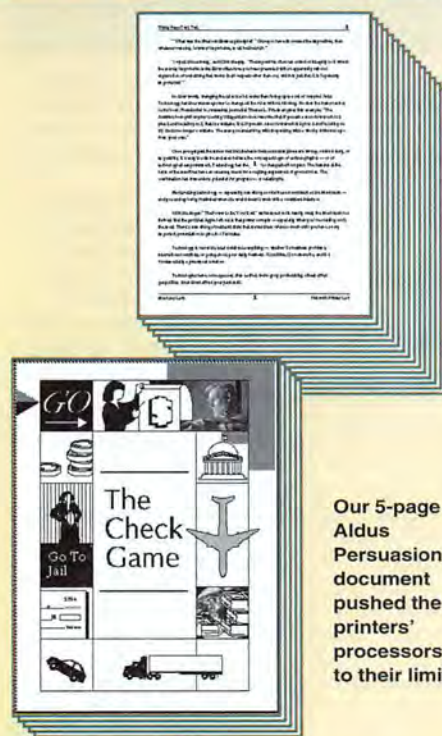
We ran into some memory problems in printers that use Adobe PostScript Level 2. When we attempted to print our complex graphics file, the Level 2 printers with 2 megabytes of RAM — the Dataproducts LZR 960, Hardware That Fits RealTech Laser, Hewlett-Packard LaserJet IIIP, MacFriends QuicKor TS, and NEC Silentwriter Model 95 — failed to finish printing the five-page Persuasion document. Some stopped printing after one or two pages, some after four. Increasing their RAM to 4 megabytes each solved the problem.

The other Level 2 printer, the Texas Instruments microLaser Turbo, ships with 2.5 megabytes of RAM — .5 megabyte soldered onto the motherboard and 2 megabytes soldered onto a daughterboard (a card that plugs in to the motherboard). Texas Instruments also offers 1-megabyte and 4-megabyte upgrades, which plug in to the daughterboard. When we installed a 1-megabyte upgrade, for a total of 3.5 megabytes of RAM, the microLaser Turbo printed the Persuasion file faster than any of the other printers did.

Despite Adobe's claims of PostScript Level 2's improved memory management, 2 megabytes of RAM may be inadequate in a Level 2 printer — unless you print only relatively simple pages like our Word and Excel documents. It's worth noting that Apple has increased the minimum RAM configuration of its LaserWriter IIf and IIfx, both Level 2 printers, to 4 megabytes — without increasing the base price.

The Tests

Because different users have different needs, we ran speed tests on three types of documents. The first was a 15-page Microsoft Word document using a single printer-resident Adobe Type 1 font, Times Roman. The second was a 5-page Microsoft Excel



Our 15-page Microsoft Word document tested engine speed.



Our 5-page Microsoft Excel spreadsheet brought processing power into the equation.

Our 5-page Aldus Persuasion document pushed the printers' processors to their limit.

spreadsheet containing some simple graphics: screened and bordered cells but no bar charts. The third was a 5-page Aldus Persuasion file that contained complex graphics imported from other applications as well as *downloadable fonts* — fonts that do not reside in printer ROM and therefore must be downloaded or fed to the printer by the computer — in Adobe Type 1 and Apple TrueType formats.

The Word-file test proved what we had suspected all along: The most significant factor affecting performance in printing a simple word-processed document is engine speed. The 4-ppm printers finished behind the 6-ppm printers, which in turn finished behind those with faster engines. Only two printers, the 4-ppm Bézier BP4040 and the 4-ppm Hewlett-Packard LaserJet IIIP, were slower than our baseline printer, the 4-ppm Apple Personal LaserWriter NT. As expected, the 11-ppm Panasonic KX-P4455 turned in one of the fastest times, sharing first place with the 9-ppm Texas Instruments microLaser Turbo. Both

were followed closely by the 9-ppm Texas Instruments microLaser Plus PS/35, which was just a few seconds slower.

However, we were struck by the fact that the printers based on Okidata's 8-ppm engine — the GCC BLP Elite 8 and BLP IIS and the Okidata OL-830 and OL-840 — all finished ahead of three 9-ppm PostScript Level 2 printers — the Dataproducts LZR 960, the Hardware That Fits RealTech Laser, and the MacFriends QuicKor TS, the latter two of which are private-label versions of the Dataproducts printer.

To check for compatibility, we repeated this test with Apple TrueType fonts loaded instead of the Adobe Type 1 bit maps. In many cases, we noted a slight delay in printing TrueType, although all the printers were able to handle it.

Simple Graphics

If you print documents that include simple graphics, such as borders and screened cells in a Microsoft Excel

spreadsheet, the speed of the PostScript interpreter and the processor will be almost as important as the printer's rated engine speed. For example, the Panasonic KX-P4455, with a slow Motorola 68000 processor, slipped down into the middle of the pack in our tests, despite its 11-ppm engine. The winners were the two Texas Instruments 9-ppm printers, followed closely by the 8-ppm GCC and Okidata printers and the 9-ppm Dataproducts LZR 960, Hardware That Fits RealTech Laser, and MacFriends QuicKor TS Level 2 printers. The NEC Silentwriter Model 95 turned in a disappointing performance, finishing behind several 4-ppm printers, despite its 6-ppm engine. This may indicate that the Silentwriter's 16-megahertz Motorola 68000 processor is underpowered for a PostScript Level 2 printer.

Four of the PostScript-clone printers — the Bézier BP 4040, the Brother HL-4PS, and the two NewGen printers — were slower than the baseline Apple Personal LaserWriter NT, even

On the Horizon

Despite the plethora of high-quality personal PostScript printers flooding the market, even more vendors are jumping into this fast-growing field. The long-established Mac-peripherals vendor Mirror has joined the growing list of companies selling a version of the Dataproducts LZR 960 PostScript Level 2 printer. The 9-ppm MirrorImage 309 is offered at \$1,699 with a single 250-sheet paper tray or at \$1,999 with two paper trays. Mirror Technologies, Inc., 2644 Patton Road, Roseville, MN 55113; 612-633-4450.

Samsung Electronics America has entered the laser-printer market with the Finalé 8000. The base model, priced at \$1,995, uses a 300-dpi 8-ppm print engine developed by Samsung and includes two 250-sheet paper trays. This PostScript-compatible printer uses a 16-megahertz Intel i960 RISC processor and ships with 2 megabytes of RAM. Slated for October availability, Samsung's \$995 ImageKit upgrade package will add PostScript Level 2 compatibility, 600-dpi resolution, gray-scale and line-art resolution enhancement, and an extra 4 megabytes of RAM. An additional \$795 provides plain-paper fax printing too. Samsung Information Systems, 301 Mayhill Street, Saddle Brook, NJ 07662; 201-587-9600.

IBM spin-off Lexmark International now offers the \$2,695 IBM LaserPrinter 6A, targeted specifically at the Mac market. In addition to the Big Blue logo, the 6A features a 6-ppm Lexmark engine and an Adobe PostScript interpreter driven by a 10-megahertz Motorola 68000 processor. PQET (Print Quality Enhancement Technology) is standard, and this 300-dpi printer can be upgraded to true 600-dpi resolution with the addition of

a \$799 4-megabyte RAM upgrade. A further option is a performance upgrade that increases the speed to 10 ppm in 300-dpi mode. Unlike other IBM laser printers, the 6A has only one interface, LocalTalk. Lexmark International, 740 New Circle Road N.W., Lexington, KY 40511; 606-232-2000.

Given the speed with which they turn trees into wastepaper, *environmentally friendly laser printers* may seem like an oxymoron. But Kyocera has developed an entirely new printing technology for its Ecosys aSi printers, cutting down on toxic wastes by doing away with disposable cartridges entirely. The printer drum's surface is coated with amorphous silicon, an extremely hard material that lasts much longer than the selenium used in disposable laser-printer cartridges. The aSi drum is combined with a long-life developer/fuser/LED imaging system that Kyocera guarantees for three years or 300,000 pages — equivalent to the life of about 60 disposable printer cartridges. And the microfine toner, dubbed Ecotone, is embedded with ceramic particles that continuously clean and polish the aSi drum. The toner container is made of a special plastic that, when burned, releases only water vapor and carbon dioxide, further reducing the amount of solid waste produced.

Kyocera claims that the first Ecosys printer, the 10-ppm FS-1500A, has a per-page cost of only .78 cent, as opposed to 3.1 cents per page for comparable laser printers. The base price of the FS-1500A is \$2,395. A LocalTalk interface and a PostScript-compatible interpreter that uses Kyocera's own PostScript clone are optional extras. Kyocera, 100 Randolph Road, Somerset, NJ 08875; 908-560-3400.



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though most of them had fast RISC-based processors. The Bézier BP4040, which uses Microsoft's TrueImage PostScript-clone page-description language, was particularly sluggish. But the Hewlett-Packard LaserJet IIIP turned in by far the slowest time of all, taking two and a half times as long as the winner, the Texas Instruments microLaser Turbo. We believe that Hewlett-Packard's use of a cartridge for providing PostScript Level 2 slows this printer down.

Complex Graphics

Our Persuasion document tested performance on complex processor-intensive graphics-laden print jobs — just like the quarterly financial report you might distribute at an in-house presentation or the brilliantly conceived prospectus that's sure to woo that new account. Here the fast processors won out, but with one caveat: As we explained earlier, RAM is important too. We had expected the Texas Instruments microLaser Turbo to do extremely well on this test, as it did on the others. But like that of the other Level 2 printers, its standard RAM configuration proved insufficient for printing the document. More on-board RAM, please?

The GCC BLP II was the only Level 1 printer that was unable to print the document with its standard 2-megabyte RAM configuration — but only because of its unique edge-to-edge printing feature. Most printers must reserve minimum top-, left-, and right-margin areas for grasping the paper and feeding it through the mechanism. GCC's BLP II-series printers grasp the page only at the top, which permits full-bleed printing — all the way to the right and left edges of the paper, with no margins. This larger print area requires more RAM for imaging the page — and users can't turn this feature off. The GCC BLP IIS, which ships with 4 megabytes of RAM, was able to print the file without having any problems.

The fastest time of all was turned in by the Texas Instruments microLaser

Figure 2: Our Cups Runneth Out



Figure 2: Several printers had intermittent difficulty in correctly rendering 48-point Optima fonts. Notice the straight ends of the characters in the example on the top, output from the NewGen Personal Series Turbo PS/300P. In contrast, the Dataproducts LZR 960 correctly produced the characteristic smooth curves, or *cups*, as shown in the output example on the bottom.

Turbo with its RAM upgraded to 3.5 megabytes. The Epson EPL-7500, which combines PostScript Level 1 with a fast 8-megahertz Weitek XL 8200 RISC processor, placed second. Next came the MacFriends QuickKor TS, the Hardware That Fits RealTech Laser, and the Dataproducts LZR 960, each with PostScript Level 2 and a slightly slower 6.25-megahertz Weitek RISC processor. The QMS-PS 410, NewGen Personal Series Turbo PS/300P, Bézier BP4040, and both GCC Elites also turned in respectable performances, as did the NewGen Personal Series Turbo PS/400P. And considering that the 400-dpi NewGen printer had to process considerably more information than did the 300-dpi printers, it performed impressively.

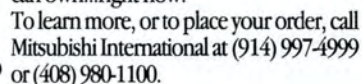
Three printers — the Okidata OL-830; the Brother HL-4PS; and bringing up the rear again, the Hewlett-Packard LaserJet IIIP — were slower at printing the Persuasion file than the

baseline Apple Personal LaserWriter NT was. The Panasonic KX-P4455, despite its 11-ppm engine, was only marginally faster than the Apple printer.

Engines and Image Quality

The time required to print any page is important, but it's only a part of the total picture. How the page looks is also important. Image quality is mainly a function of the *print engine*, the mechanism that transfers the toner to the page, and its *controller*, the electronics that manage the print engine. In the 21 printers we looked at, eight different print engines were used. Sometimes the same engine produced different image-quality results in different printers, but those differences were minimal. The NewGen Personal Series Turbo PS/400P was the only one of the printers that stood out from the rest of the pack in terms of graphic image quality, clearly because of its

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The Bottom Line

Our all-around favorites are the **Dataproducts LZR 960** (\$2,195 list, \$1,800 street) and its two private-label cousins the **Hardware That Fits RealTech Laser** (\$1,695 direct) and the **MacFriends QuickKor TS** (\$1,588 direct). All three feature PostScript Level 2 interpreters based on the Weitek XL 8200 RISC processor and fast 9-ppm Sharp engines. Standard features include 250-sheet paper trays, SCSI ports for connecting hard-disk drives, and automatic switching between serial and parallel ports — enough standard equipment to make these printers sturdy and talented workhorses. Dataproducts and Hardware That Fits offer second trays at \$369 and \$199, respectively. An optional legal-sized tray, two additional toner cartridges, and a cable are available from MacFriends for \$100. But remember, with PostScript Level 2 printers, the standard 2-megabyte RAM configuration is inadequate for printing complex documents: If you print lots of graphics, be prepared to spend an additional \$200 to \$350 to upgrade to 3.5 or 4 megabytes.

If pure speed is what you need, consider the **Texas Instruments microLaser Turbo** (\$2,349 list, \$1,950 street). It's a Level 2 upgrade of the Level 1 **Texas Instruments microLaser Plus PS35** (\$1,849 list, \$1,400 street) — also a top performer.

Kudos also goes to the **GCC BLP IIS** (\$2,599 direct). It features edge-to-edge printing and an 8-ppm engine, and it was the only printer we tested that comes standard with 4 megabytes of RAM. It also ships with two 200-sheet paper trays and is a great small-business printer.

Honorable mention goes to the **NewGen Personal Series Turbo PS/400P** (\$2,595 list, \$2,195 street). It's no speed demon, but in our tests, its 400-dpi resolution produced graphic images that were noticeably superior to those of any of the other printers, which were limited to 300-dpi resolution. (The Hewlett-Packard LaserJet IIIP scored the highest marks for text quality but was painfully slow.)



Top personal-PostScript-printer honors are shared by the fast PostScript Level 2-equipped **Hardware That Fits RealTech Laser** (top), **MacFriends QuickKor TS** (middle left), and **Dataproducts LZR 960** (bottom right). The **Texas Instruments microLaser Turbo** (middle right) is our choice for high-speed printing; the dual-tray **GCC BLP IIS** (bottom left) is ideal for a small office or workgroup.

superior 400-dpi resolution.

However, when our expert jury examined output samples from each printer, it found one difference that was attributable to the PostScript interpreter rather than to the engine or its controller. One component of our test page was a 48-point Optima headline. The printers from Bézier, Brother, Everex, and Panasonic; the NewGen Personal Series Turbo PS/300P; and the Okidata OL-840 all had intermittent difficulty reproducing the curved indentations, or cups, in Adobe's Type 1 Optima font family (see Figure 2).

In the case of the clone printers, this may indicate a problem with reading the *hinting*, the special instructions built in to PostScript Type 1 fonts for improving a font's appearance on 300-dpi laser printers. The Okidata OL-840 and the Panasonic KX-P4455 —

both true Adobe PostScript Level 1 printers — lack the ATM font rasterizer, a software routine that converts outline data into scalable curves and that is built in to later versions of Adobe's PostScript interpreter. By the time you read this article, however, Okidata should be selling the OL-840 with the same PostScript ROM as the OL-830, which includes the font rasterizer.

Let's Get Personal

After we tested, prodded, and peered at the output from these 21 personal PostScript printers, the results were clear: PostScript printing is faster and less expensive than ever before. Almost all the printers we tested were faster than our baseline printer, the Apple Personal LaserWriter NT, and prices continue to plummet toward, or in several cases are well below, the

\$2,000 mark. Add a respectable showing in image quality to the equation, and you have no reason not to invest in a personal PostScript printer.

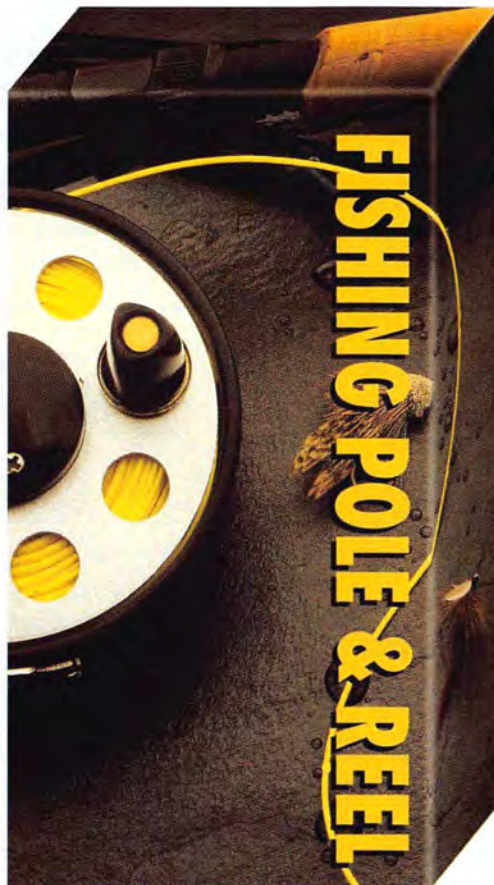
But be forewarned: PostScript-clone printers still have a way to go before they can rival true Adobe PostScript printers. Even ignoring compatibility problems with newer Apple drivers, the clones we tested couldn't compete in terms of speed and price, even though many use fast RISC-based processors. The one exception is the NewGen Personal Series Turbo PS/400P, which offers superior image quality, because of its 400-dpi resolution. Look at "The Bottom Line" for our picks.

Bruce Fraser is the author of *Adobe Illustrator 3.0 Complete* and *Using FreeHand 3.0*. He lives in San Francisco's foggy Sunset district and eats font rasterizers for breakfast.

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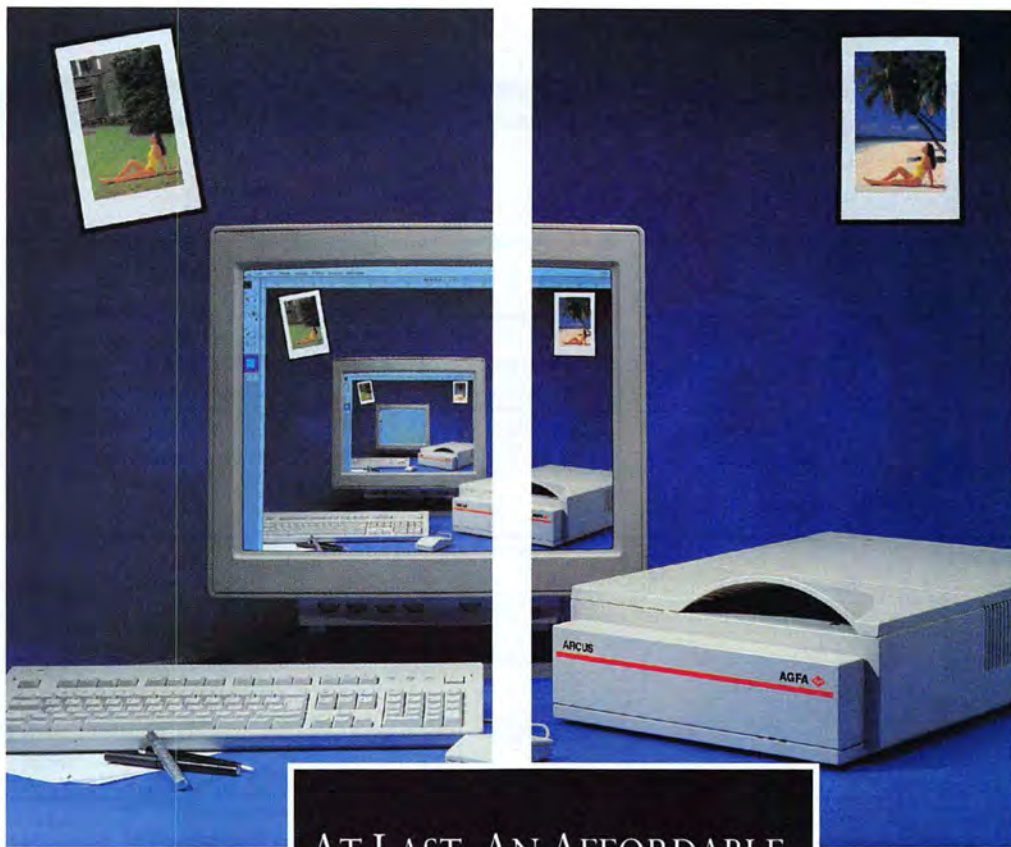
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Table 1: Features of Personal PostScript Printers

	Apple Personal LaserWriter NT ⚡⚡½	Bézier BP4040 ⚡⚡½	Brother HL-4PS ⚡⚡½	Dataproducts LZR 960 ⚡⚡⚡½	Epson EPL-7500 ⚡⚡⚡½
List price	\$2,599	\$1,895	\$2,595	\$2,195	\$2,999
Street price	\$1,399	\$1,600	\$1,595	\$1,800	\$2,000
Pros	Good text quality. Convenient consumables.	Good text quality. Convenient consumables.	Convenient consumables.	Good text quality. Two-year warranty.	Good text quality. Convenient consumables. Two-year warranty.
Cons	Somewhat slow.	Low-quality 50-sheet paper tray. Driver-compatibility problems.	Low-quality 50-sheet paper tray. Driver-compatibility problems. Expensive RAM upgrades.	Insufficient standard RAM for some complex graphics.	Highest list price.
Specifications					
Interpreter	PostScript Level 1	TrueImage 1.1	BrScript	PostScript Level 2	PostScript Level 1
Engine	Canon LX	Canon LX	Canon LX	Sharp	Minolta SP101
Resolution	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
Engine life	150,000 pages	150,000 pages	150,000 pages	not rated	180,000 pages
Monthly duty cycle	not rated	5,000 pages	25,000 pages	5,000 pages	3,000 pages
Microprocessor, speed	Motorola 68000, 12 MHz	AMD 29005, 16 MHz	TI 34010, 40 MHz	Weitek 8200, 6.25 MHz	Weitek XL 8200, 8 MHz
Engine speed	4 ppm	4 ppm	4 ppm	9 ppm	6 ppm
Memory (standard, max.)	2 MB, 6 MB	2 MB	2 MB, 6 MB	2 MB, 10 MB	2 MB, 6 MB
Memory upgrade, price	4 MB, \$1,249	none	1 MB, \$495; 2 MB, \$990; 4 MB, \$1,980	1 MB, \$225; 2 MB, \$345; 4 MB, \$475; 8 MB, \$845	2 MB, \$499; 4 MB, \$899
Interfaces	LocalTalk, serial	LocalTalk, parallel, serial	LocalTalk, parallel, serial	LocalTalk, parallel, serial, SCSI	LocalTalk, parallel, serial
Printing emulations	HP LaserJet Plus, Diablo 630	HP PCL 4	HP PCL 4	HP PCL 4	HP PCL 4
Resolution enhancements	none	none	none	none	none
No. of ROM-resident fonts	35	35	35	35	35
Bundled software	none	none	none	none	none
Paper handling					
Paper weight	28 lb	28 lb	28 lb	30 lb	42 lb
No. of trays, pages/tray	2, 50 and 250	1,* 50	1,* 50	1,* 250	1, 250
Paper sizes	letter, envelope	letter, legal, envelope, executive, A4, B5	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope
Envelope-tray option	\$89	none	\$99	\$299	none
Miscellaneous					
Consumables (price, copies)	\$99, 3,500	\$79, 3,500	\$119, 3,500	\$189, 50,000 (drum) \$149, 25,000 (developer) \$69, 3,000 (toner)	\$239, 8,000
Dimensions (L x W x H)	18.3 x 15 x 9.8 in.	15.9 x 13.8 x 8 in.	13.6 x 16 x 8 in.	15 x 13.33 x 10.5 in.	15 x 19.5 x 7.3 in.
Weight	32 lb	26 lb	26.5 lb	33.5 lb	40.1 lb
Warranty	1 year	1 year	1 year	2 years	2 years
Company	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 408-996-1010	Bézier Systems, Inc. 1190 Saratoga Ave. San Jose, CA 95129 408-345-0345	Brother 200 Cottontail Ln. Somerset, NJ 08575 908-356-8880	Dataproducts Corp. 6219 Desoto Ave. Woodland Hills, CA 91365 800-334-3174 818-887-8000 818-887-4789 (fax)	Epson America, Inc. 20770 Madrona Ave. Torrance, CA 90503 800-922-8911 310-782-0770 310-782-5220 (fax)

*Optional second 250-sheet tray available.



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Table 1: Features of Personal PostScript Printers, continued

	Everex LaserScript LX \$\$\$	GCC BLP Elite \$\$\$	GCC BLP Elite 8 \$\$\$½	GCC BLP II \$\$\$	GCC BLP IIS \$\$\$\$
List price	\$1,995	\$1,399	\$1,699	\$1,799	\$2,599
Street price	\$1,500	\$1,399	\$1,699	\$1,799	\$2,599
Pros	Inexpensive RAM upgrade.	Bundled software. Inexpensive RAM upgrade.	Bundled software. Inexpensive RAM upgrade.	Edge-to-edge printing. Bundled software. Inexpensive RAM upgrade.	Edge-to-edge printing. Bundled software. Two paper trays.
Cons	Some minor PostScript incompatibilities.	Only 17 resident fonts.	Only 17 resident fonts.	Insufficient standard RAM for some complex graphics.	Expensive. No RAM upgrade available.
Specifications					
Interpreter	Microsoft-Bauer PDL	PostScript Level 1	PostScript Level 1	PostScript Level 1	PostScript Level 1
Engine	TEC	OkiLaser 400	OkiLaser 800	OkiLaser 400	OkiLaser 800
Resolution	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
Engine life	350,000 pages	180,000 pages	300,000 pages	180,000 pages	300,000 pages
Monthly duty cycle	3,000 pages	3,000 pages	5,000 pages	3,000 pages	5,000 pages
Microprocessor, speed	Nat'l Semi., 25 MHz	Motorola 68000, 16.67 MHz	Motorola 68000, 16.67 MHz	Motorola 68000, 16.67 MHz	Motorola 68000, 16.67 MHz
Engine speed	6 ppm	4 ppm	8 ppm	4 ppm	8 ppm
Memory (standard, max.)	2.5 MB, 4.5 MB	2 MB, 4 MB	2 MB, 4 MB	2 MB, 4 MB	4 MB
Memory upgrade, price	2 MB, \$200	2 MB, \$199	2 MB, \$199	2 MB, \$199	none
Interfaces	LocalTalk, parallel, serial	LocalTalk, serial	LocalTalk, serial	LocalTalk, SCSI	LocalTalk, SCSI
Printing emulations	HP PCL 4	none	none	none	none
Resolution enhancements	none	none	none	none	none
No. of ROM-resident fonts	35	17	17	35	35
Bundled software	none	QuickEnvelope	QuickEnvelope	QuickEnvelope	QuickEnvelope
Paper handling					
Paper weight	27 lb	34 lb	34 lb	34 lb	34 lb
No. of trays, pages/tray	1, 150	1, 200	1, 200	1, 200	2, 200
Paper sizes	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope
Envelope-tray option	standard	\$89	\$89	\$89	\$89
Miscellaneous					
Consumables (price, copies)	\$150, 10,000 (drum and developer)	\$289, 15,000 (drum and developer)	\$289, 15,000 (drum and developer)	\$289, 15,000 (drum and developer)	\$289, 15,000 (drum and developer)
	\$40, 1,500 (toner)	\$33, 2,500 (toner)	\$33, 2,500 (toner)	\$33, 2,500 (toner)	\$33, 2,500 (toner)
Dimensions (L x W x H)	15.4 x 16.1 x 8.3 in.	17.7 x 17.7 x 5.24 in.	17.7 x 17.7 x 5.24 in.	17.7 x 17.7 x 5.24 in.	17.7 x 17.7 x 5.24 in.
Weight	35.3 lb	24 lb	24 lb	24 lb	24 lb
Warranty	1 year	1 year	1 year	1 year	1 year
Company					
	Everex Systems 48431 Milmont Dr. Fremont, CA 94538 800-821-0806 510-498-1111 510-687-0520 (fax)	GCC Technologies, Inc. 580 Winter St. Waltham, MA 02154 800-422-7777 617-890-0880 617-890-0822 (fax)	GCC Technologies, Inc. 580 Winter St. Waltham, MA 02154 800-422-7777 617-890-0880 617-890-0822 (fax)	GCC Technologies, Inc. 580 Winter St. Waltham, MA 02154 800-422-7777 617-890-0880 617-890-0822 (fax)	GCC Technologies, Inc. 580 Winter St. Waltham, MA 02154 800-422-7777 617-890-0880 617-890-0822 (fax)

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When C. David Piña created the graphics for the 63rd Annual Academy Awards, he cast his NewGen™ printer to play a vital supporting role.

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Table 1: Features of Personal PostScript Printers, continued

	Hardware That Fits RealTech Laser ††††½	Hewlett-Packard LaserJet IIIIP ††½	MacFriends QuicKor TS ††††½	NEC Silentwriter Model 95 ††††	NewGen Personal Series Turbo PS/300P ††
List price	\$1,695	\$2,495 w/ Level 2 cartridge	\$1,588	\$1,749	\$1,995
Street price	\$1,695	\$1,800	\$1,588	\$1,500	\$1,695
Pros	Good text quality. Bundled software. Two-year warranty.	Excellent text quality. Convenient consumables.	Good text quality.	Very good text quality. Convenient consumables.	Convenient consumables.
Cons	Insufficient standard RAM for some complex graphics.	Low-quality 50-sheet paper tray. Slowest printer tested. Insufficient standard RAM for some complex graphics.	Insufficient standard RAM for some complex graphics.	Insufficient standard RAM for some complex graphics.	Low-quality 50-sheet paper tray. Mediocre image quality.
Specifications					
Interpreter	PostScript Level 2	PostScript Level 2	PostScript Level 2	PostScript Level 2	Weitek
Engine	Sharp	Canon LX	Sharp	NEC Model 90	Canon LX
Resolution	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
Engine life	500,000 pages	not rated	300,000 pages	180,000 pages	150,000 pages
Monthly duty cycle	5,000 pages	8,000 pages	3,000 pages	6,000 pages	3,500 pages
Microprocessor, speed	Weitek XL 8200, 6.25 MHz	Motorola 68000, 16 MHz	Weitek XL 8200, 6.25 MHz	Motorola 68000, 16.67 MHz	Weitek XL 8220, 16 MHz
Engine speed	9 ppm	4 ppm	9 ppm	6 ppm	4 ppm
Memory (standard, max.)	2 MB, 10 MB	2 MB, 4 MB	2 MB, 10 MB	2 MB, 4 MB	2 MB,† 16 MB
Memory upgrade, price	1 MB, \$159; 2 MB, \$199; 4 MB, \$395; 8 MB, \$699	1 MB, \$230; 2 MB, \$390	1 MB, \$149; 2 MB, \$229; 4 MB, \$349; 8 MB, \$588	2 MB, \$399	1 MB, \$149; 2 MB, \$299; 4 MB, \$599
Interfaces	LocalTalk, parallel, serial, SCSI	LocalTalk, parallel, serial	LocalTalk, parallel, serial, SCSI	LocalTalk, parallel, serial	LocalTalk, parallel, serial
Printing emulations	HP PCL 4	HP PCL 5	HP PCL 4	HP PCL 5, HP GL	HP PCL 4, HP GL
Resolution enhancements	none	RET	none	SET	none
No. of ROM-resident fonts	35	35	35	35	35
Bundled software	software tray selector	none	none	none	none
Paper handling					
Paper weight	30 lb	28 lb	31 lb	41 lb	28 lb
No. of trays, pages/tray	1,* 250	1,* 50	1,* 250	1,* 250	1,* 50
Paper sizes	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope
Envelope-tray option	\$269	\$89	\$329	standard	\$89 (needs lower tray, \$195)
Miscellaneous					
Consumables (price, copies)	\$139, 30,000 (drum) \$109, 20,000 (developer) \$59, 2,500 (toner)	\$95, 3,500	\$169, 20,000 (drum) \$129, 10,000 (developer) \$54, 2,500 (toner)	\$199, 6,000	\$99, 3,500
Dimensions (L x W x H)	14.2 x 13.4 x 10.9 in.	16 x 13.8 x 8 in.	14.2 x 13.4 x 10.9 in.	15 x 18.6 x 9.5 in.	16 x 13.5 x 7.5 in.
Weight	33.5 lb	22 lb	33.5 lb	37.5 lb	24 lb
Warranty	2 years	1 year	1 year	1 year	1 year
Company	Hardware That Fits 610 S. Frazier Conroe, TX 77301 800-972-3018 409-539-3959 409-539-4141 (fax)	Hewlett-Packard Co. 19310 Pruneridge Ave. Cupertino, CA 95014 800-752-0900 208-323-2551 208-344-4809 (fax)	MacFriends 8235 N. Vancouver Ave. Portland, OR 97217 800-331-1322 503-286-9350 503-286-8710 (fax)	NEC Technologies, Inc. 1414 Massachusetts Ave. Boxborough, MA 01719 800-388-8888 508-264-8000 508-264-8673 (fax)	NewGen Systems Corp. 17580 Newhope St. Fountain Valley, CA 92708 800-756-0556 714-641-8600

*Optional second 250-sheet tray available.

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Table 1: Features of Personal PostScript Printers, continued

	NewGen Personal Series Turbo PS/400P \$\$\$	Okidata OL-830 \$\$\$\$	Okidata OL-840 \$\$\$½	Panasonic KX-P4455 \$\$\$½	QMS QMS-PS 410 \$\$\$
List price	\$2,595	\$1,999	\$2,599	\$2,995	\$1,995
Street price	\$2,195	\$1,299	\$1,599	\$1,850	\$1,500
Pros	Excellent image quality. Convenient consumables.	Good text quality. Bundled software.	Bundled software.	Fast on straight-text files. Bundled software. Two paper trays.	Bundled software. Convenient consumables.
Cons	Low-quality 50-sheet paper tray. Expensive.	Only 17 resident fonts. LocalTalk port not standard.	Lacks ATM font rasterizer. Expensive.	Lacks ATM font rasterizer. Inconvenient toner bottle. Expensive.	Low-quality 50-sheet paper tray.
Specifications					
Interpreter	Weitek	PostScript Level 1	PostScript Level 1	PostScript Level 1	PostScript Level 1
Engine	Canon LX	Okilaser 800	Okilaser 800	Panasonic	Canon LX
Resolution	400 dpi	300 dpi	300 dpi	300 dpi	300 dpi
Engine life	150,000 pages	300,000 pages	300,000 pages	300,000 pages	360,000 pages
Monthly duty cycle	3,500 pages	16,000 pages	16,000 pages	20,000 pages	6,000 pages
Microprocessor, speed	Weitek XL 8220, 16 MHz	Motorola 68000, 12 MHz	Motorola 68000, 12 MHz	Motorola 68000, 16 MHz	Motorola 68020, 16.67 MHz
Engine speed	4 ppm	8 ppm	8 ppm	11 ppm	4 ppm
Memory (standard, max.)	4 MB, 16 MB	2 MB, 4 MB	2 MB, 4 MB	2 MB, 4 MB	2 MB, 6 MB
Memory upgrade, price	1 MB, \$149; 2 MB, \$299; 4 MB, \$599	2 MB, \$399	2 MB, \$399	2 MB, \$275	1 MB, \$345; 2 MB, \$495; 4 MB, \$795
Interfaces	LocalTalk, parallel, serial	LocalTalk/serial (\$199), parallel	LocalTalk, parallel, serial	LocalTalk, parallel, serial	LocalTalk, parallel, serial
Printing emulations	HP PCL 4, HP GL	HP PCL 4, Diablo 630	HP PCL 4, Diablo 630	HP PCL 4, Diablo 630	HP PCL 4
Resolution enhancements	IET	none	none	none	none
No. of ROM-resident fonts	35	17	35	39	45
Bundled software	none	LaserTools	LaserTools	none	PS Executive Utilities
Paper handling					
Paper weight	28 lb	32 lb	32 lb	24 lb	28 lb
No. of trays, pages/tray	1,* 50	1,* 200	1,* 200	2, 250	1,* 50
Paper sizes	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope	letter, legal, envelope
Envelope-tray option	none	\$89	\$89	\$85	\$89
Miscellaneous					
Consumables (price, copies)	\$99, 3,500	\$289, 15,000 (drum and developer) \$33, 2,500 (toner)	\$289, 15,000 (drum and developer) \$33, 2,500 (toner)	\$190, 13,000 (drum and developer) \$45, 5,000 (toner)	\$95, 3,500
Dimensions (L x W x H)	16 x 13.5 x 7.5 in.	17.7 x 17.7 x 6.5 in.	17.7 x 17.7 x 8.5 in.	17 x 28 x 14.5 in.	13.5 x 16 x 7.5 in.
Weight	24 lb	29 lb	37 lb	59.6 lb	26 lb
Warranty	1 year	1 year	1 year	1 year	1 year
Company	NewGen 17580 Newhope St. Fountain Valley, CA 92708 800-756-0556 714-641-8600	Okidata 532 Fellowship Rd. Mount Laurel, NJ 08054 800-654-3282 609-235-2600	Okidata 532 Fellowship Rd. Mount Laurel, NJ 08054 800-654-3282 609-235-2600	Panasonic 2 Panasonic Way Secaucus, NJ 07094 800-222-0584 201-348-7000	QMS Inc. 1 Magnum Pass Mobile, AL 36618 800-631-2692 205-633-4300 205-633-0116 (fax)

*Optional second 250-sheet tray available.

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RISC Processor	✖	
Standard RAM	8 MB	5 MB
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Upgrade controllers are available to give full Accel-a-Writer 8000 functionality to LaserJet® & LaserWriter® printers.		



Table 1: Features, continued

	Texas Instruments microLaser Plus PS35 !!!!	Texas Instruments microLaser Turbo !!!!
List price	\$1,849	\$2,349
Street price	\$1,400	\$1,950
Pros	Fast for text and simple graphics.	Fastest printer tested.
Cons	Insufficient standard RAM for some complex graphics.	Insufficient standard RAM for some complex graphics.
Specifications		
Interpreter	PostScript Level 1	PostScript Level 2
Engine	Sharp	Sharp
Resolution	300 dpi	300 dpi
Engine life	indefinite	indefinite
Monthly duty cycle	10,000 pages	10,000 pages
Microprocessor, speed	Motorola 68000, 12 MHz	Weitek XL 8220, 16 MHz
Engine speed	9 ppm	9 ppm
Memory (standard, max.)	1.5 MB, 4.5 MB	2.5 MB, 10.5 MB
Memory upgrade, price	1 MB, \$239	1 MB, \$239; 4 MB, \$589
Interfaces	LocalTalk, parallel, serial	LocalTalk, parallel, serial
Printing emulations	HP PCL 4	HP PCL 4
Resolution enhancements	none	none
No. of ROM-resident fonts	35	35
Bundled software	none	none
Paper handling		
Paper weight	24 lb	24 lb
No. of trays, pages/tray	1,* 250	1,* 250
Paper sizes	letter, legal, envelope	letter, legal, envelope, B5, 7.25 x 10.5 in.
Envelope-tray option	\$275	\$275
Miscellaneous		
Consumables (price, copies)	\$110, 50,000 (drum) \$90, 25,000 (developer) \$42, 3,000 (toner)	\$110, 50,000 (drum) \$90, 25,000 (developer) \$42, 3,000 (toner)
Dimensions (L x W x H)	14 x 13.5 x 10.5 in.	14 x 13.5 x 10.5 in.
Weight	33.5 lb	33.5 lb
Warranty	1 year	1 year
Company		
	Texas Instruments, Inc. P.O. Box 202230 Austin, TX 78720 800-527-3500 817-771-5856 817-774-6660 (fax)	Texas Instruments, Inc. P.O. Box 202230 Austin, TX 78720 800-527-3500 817-771-5856 817-774-6660 (fax)

*Optional second 250-sheet tray available.

Table 1 Criteria

List price — The vendor's suggested retail price for the printer in its standard configuration.

Street price — The price of the printer through mail order or at dealers surveyed across the U.S. in June 1992.

Interpreter — The printer's interpreter, either an Adobe PostScript Level 1 or Level 2 interpreter or a PostScript-compatible interpreter from the printer's manufacturer or from another vendor.

Engine — The make and model of the printer's engine.

Resolution — The resolution of the printer's engine, in dpi (dots per inch).

Engine life — The estimated number of pages the printer's engine can print in its lifetime.

Monthly duty cycle — The manufacturer's recommended maximum number of pages to be printed per month.

Microprocessor, speed — The processor, or chip, that powers the printer and the processor's clock speed, in megahertz.

Engine speed — The rated speed of the engine, in ppm (pages per minute).

Memory (standard, max.) — The amount of on-board RAM shipped with the printer and the maximum amount of memory the printer can accommodate, in megabytes.

Memory upgrade, price — The RAM-upgrade configurations available, in megabytes, and the price of each.

Interfaces — The standard ports available for connecting computer cables to the printer.

Printing emulations — The page-description languages (in addition to PostScript) that the printer is able to support.

Resolution enhancements — Any special technology the printer uses to improve the appearance of output, such as smoothing jagged edges.

No. of ROM-resident fonts — The number of outline fonts in ROM that are shipped with the printer.

Bundled software — The additional software controls provided with the printer.

Paper weight — The heaviest paper stock the printer can handle, in pounds.

No. of trays, pages/tray — The number of paper trays shipped with the printer and the number of sheets of 24-pound paper each tray can hold.

Paper sizes — The paper sizes the printer can handle.

Envelope-tray option — The price for an optional tray for feeding envelopes to the printer.

Consumables (price, copies) — The cost and life expectancy of replacement all-in-one consumables or of separate drum, developer, and toner.

Dimensions (L x W x H) — The length, width, and height of the printer, in inches, without the paper tray installed.

Weight — How heavy the printer is, in pounds.

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330 MB	N/A	\$1,199
425 MB	N/A	\$1,299
425 MB (Q)	\$1,289	\$1,349
595 MB	N/A	\$1,599
1 GB	N/A	\$2,099
45 MB Portable Drive	\$269	
50 MB (Q) Portable Drive	\$299	
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128 MB Optical Drive	\$1,399	
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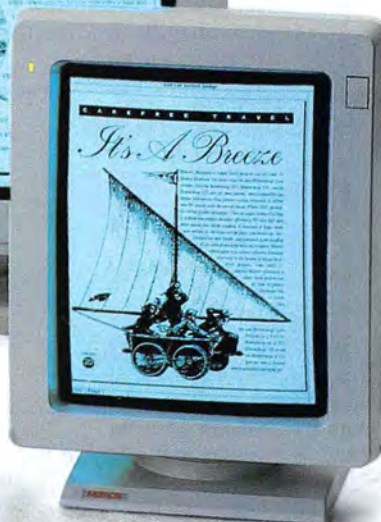
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Postscript 2 laser printer
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15-inch Analog Portrait Display	\$399*	◀
w/ monochrome video card	\$549	◀

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What You Get

Although the PrecisionColor Display/20 has a 20-inch tube and the MultiSync 6FG comes with a 21-inch tube, the displays' active-screen areas are basically the same. The NEC monitor uses a shadow-mask technology,



Figure 1: The two-page color NEC MultiSync 6FG (right) and Radius PrecisionColor Display/20 (left) each include an accelerated-video card.

which has shed its once-deserved second-class status and can now compete with the Sony Trinitron tube used by the Radius monitor, crisp pixel by crisp pixel.

As we went to press, NEC lowered the price of its MultiSync 6FG monitor to \$2,899. The 24-bit NEC MultiSync 6FG display system — monitor and display card — costs \$4,798, and the Radius PrecisionColor Display/20 display system is \$5,298. An 8-bit display system is available from each manufacturer at a lower cost.

Each system is bundled with an accelerated-video card manufactured by Radius (see "Chasing Rainbows: Accelerated-Video Cards," May '92, Buyer's Guide page 16). NEC's card uses a different ROM and different standards than are used by Radius; Radius calls its card the PrecisionColor 24X, and NEC's is called the MacFG 24X. Each

system includes software for on-the-fly switching among multiple resolutions, including 640 x 480, 1024 x 768, and 1152 x 870 pixels, and front-panel digital controls remember settings for image position and size at each resolution. NEC ships a software-only version — a monitor with software but no display card — that provides Quadra users with multiple resolutions while running off the built-in video port (see Figure 2).

The PrecisionColor Display/20 also includes a *convergence control* for precision color adjustments, and the MultiSync 6FG features NEC's AccuColor System, which allows you to change the display colors to closely approximate those of your output device. NEC provides a MacroMind Director-based tutorial for its AccuColor System — you can even run it while you make adjustments.



Find out more about sharp, versatile autosynchronous monitors in the August '92 issue ("Perfection for Pennies: Autosynchronous Monitors," page 158).

How They Look

We used precision monitor-testing equipment at ZD Labs, the new multimillion-dollar testing facility of Ziff-Davis Publishing, *MacUser's* parent company, to test both of the display systems along with our reference standard, the 13-inch AppleColor High-Resolution RGB Monitor. After reviewing data on focus, image quality, color accuracy, and brightness, we found that neither large-screen system was as sharp as the smaller AppleColor. The MultiSync 6FG was brighter than the PrecisionColor Display/20, and each was brighter than the notoriously dim AppleColor (see Figure 3).

The Bottom Line

The NEC MultiSync 6FG and the Radius PrecisionColor Display/20 are both bright and sharp — a difficult achievement for large-screen monitors — so choosing between them depends on your needs. If your work requires highly saturated colors and better overall color quality than that produced by the AppleColor, the PrecisionColor Display/20 is for you, but if color accuracy is critical in your work, you'll need to add a Radius Precision-Color Calibrator, which costs \$599 extra.

Color accuracy is less of a problem with the NEC MultiSync 6FG. Although its colors are less vivid, its AccuColor System provides good out-of-the-box accuracy for image scanning and other color-critical work. Also, if you're on a tight budget, bear in mind that the MultiSync 6FG is the less expensive of the two systems — a list-price difference of \$600. And for those who use a Quadra, NEC's software provides cost-effective multiple resolutions when the monitor's connected to the Quadra's built-in video port.

— Jeff Pittelkau

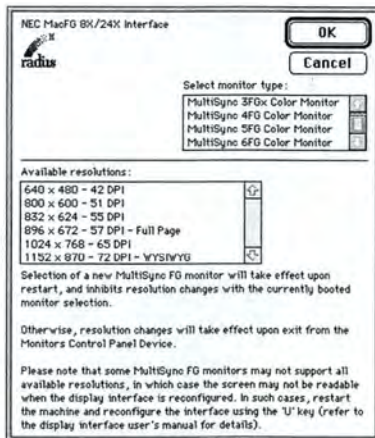


Figure 2: NEC and Radius use software designed by Radius that allows users to change their monitor resolution on the fly. NEC also provides software that gives Quadra users the advantage of multiple monitor resolutions when the monitor's connected to the Quadra's built-in video port — without requiring a separate display card.

Figure 3: Overall Performance

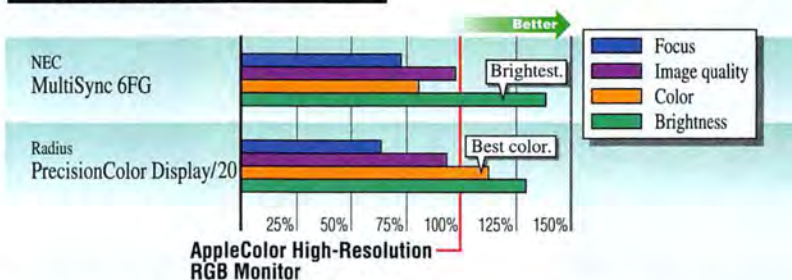


Figure 3: The familiar 13-inch AppleColor High-Resolution RGB Monitor, our reference standard, has excellent focus and overall image quality — a far easier feat for its small Trinitron tube than for the tubes of the large-screen NEC MultiSync 6FG and the Radius PrecisionColor Display/20. However, you won't be disappointed by the professional image quality of either large monitor: The PrecisionColor Display/20 has the most-vibrant colors, and the MultiSync 6FG is the brightest.

Table 1: Features

	NEC MultiSync 6FG ★★★★	Radius PrecisionColor Display/20 ★★★★
List price	8-bit, \$3,798; 24-bit, \$4,798	8-bit, \$4,198; 24-bit, \$5,298
Street price	8-bit, \$3,169; 24-bit, \$3,998	8-bit, \$3,746*; 24-bit, \$4,575
Pros	Brighter. AccuColor system allows adjustment of RGB levels. Degauss button.	Better color. Glare protection standard. One-year transferrable warranty.
Cons	Glare protection optional. One-year warranty to original purchaser only.	Degauss on power-up only. Color calibration a \$599 option.
Company	NEC Technologies, Inc. 1255 Michael Dr. Wood Dale, IL 60191 800-632-4636 708-860-9500	Radius, Inc. 1710 Fortune Dr. San Jose, CA 95131 800-227-2795 408-434-1010

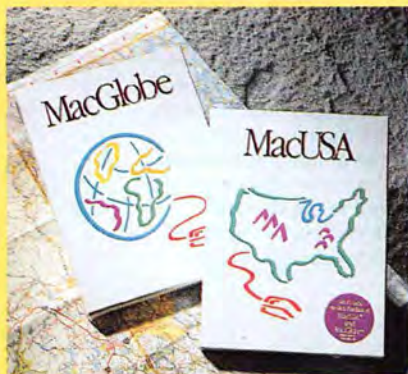
*A nonupgradable 8-bit system is available for \$3,898.

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❷ **MacUSA** Every Mac user who wants fast, accurate information on 50 states and Puerto Rico, coupled with superb maps and graphics, will love MacUSA. Provides you with an instant profile of each state that includes: city locations, elevations and natural features; demographic, economic, political, climate and health data; state flags and entire state songs. **Publisher: PC Globe GRA0246**

\$39*



Sprout!

❶ **Sprout!** is a complete computer planning tool for vegetable gardeners. Its unique planting tool snaps to correct row and plant spacings and automatically fills in plant symbols, producing a graphic, scalable garden plan. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions containing: planting and harvesting times, yield, soil PH, growing tips, and other information. Standard text and drawing tools are included allowing users to create their own vegetable symbols and customize garden designs. Sprout! prints out garden layouts, calendars, shopping lists, and reports. **Publisher: Abracadabra GRA0339**

\$45



JAG or Ray Dream Designer 2.0*

❶ Remove jagged! **JAG** works in the background, removing jagged edges from PICT files automatically, producing pixel perfect 8-bit and 24-bit still images and animations. It works with images created in color paint applications and with scanned images. With its sophisticated edge-detection scheme, JAG produces sharp, clear images of superior quality to those produced by edge-blurring filters. **GRA0291 \$79.**

❷ **Ray Dream Designer's** drawing and text tools for creating lines, circles, ellipses, polygons, Beziers, colors and shadings, are virtually the same as those in most 2D illustration programs. But now your objects have the realistic look of three dimensions. It even comes with a library of 3D solid textures to be used as-is or customized. Lighting, shadows, transparency, reflections and perspective are handled automatically. **Publisher: Ray Dream GRA0292**

\$629*

Painter 1.2

❶ Fractal Design's **Painter 1.2** simulates the tools and textures of natural media. Painter's revolutionary approach has earned it 5-mice, MacUser's Eddy Award, MacWeeks Target Award and Personal Publishings paint program of the year. Among Painter's customizable tools are airbrushes, crayons, felt pens, chalk, charcoal, pencils, calligraphy pens, and water color brushes. All the tools interact with the surfaces to create the complex textures of natural media. It supports Photoshop plug-ins and ColorStudio masks, and the Wacom pressure-sensitive stylus and tablet.

Publisher: Fractal Design GRA0323



\$285



WristSaver/ WristSaver MousePad

The **WristSaver** cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The **WristSaver MousePad** provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand.

Manufacturer: LB Innovators
WristSaverMousePad ACC0635 \$15.
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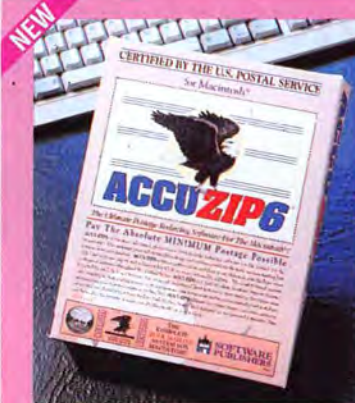
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Canvas 3

❶ **Canvas 3** is fast, powerful, easy to learn and provides all the tools you'll need to create and print professional quality color or monochrome graphics. Use in a wide range of design projects including desktop publishing, technical illustration, design graphics, architectural rendering, engineering drawing, presentations, multimedia and general business graphics. Canvas 3 offers unparalleled productivity. Create illustrations from scratch with our new freehand tool, or scan existing artwork and let Canvas auto trace its outlines for you. System 7 Savvy! **1991 MacUser Editor's Choice Award.** **Publisher: Deneba Software GRA0280**



\$249



AccuZip6

❶ **AccuZip6** is the most advanced, professional-level postage reducing software on the market for the Macintosh®. This extremely powerful mailing list management software produces the most accurate mailing lists possible from your database. **AccuZip6** corrects, parses and standardizes every address in your database, then adds Carrier Route, Zip+4 and a Postnet Bar Code to every deliverable address. Thoroughly tested against millions of addresses throughout the United States, **AccuZip6** is CASS (Coding Accuracy Support System) Certified by the U.S. Postal Service. **AccuZip6** doesn't stop there. **AccuZip6** performs 1st, 2nd and 3rd class presorts, produces all applicable bulk mail forms, sack tags and labels necessary to do bulk mailing. A built in word processor will handle all of your mail merging tasks. **Publisher: Software Publisher, Inc. BUS0235**

\$639

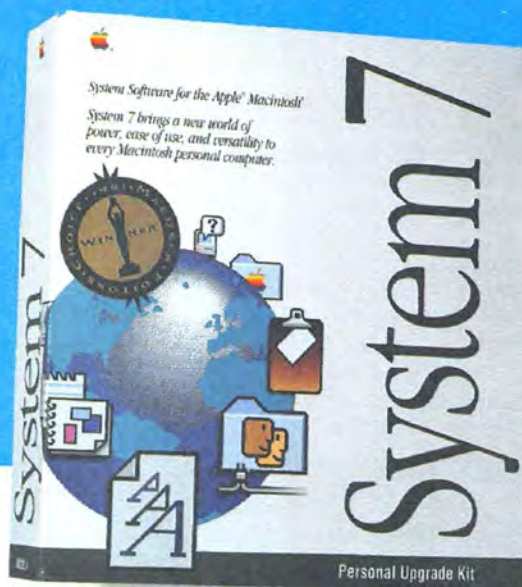
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\$69



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Aldus IntelliDraw defines an exciting new category of drawing program, with intelligent features that give you an easy new way to visually experiment, refine, and draw your ideas. Innovative smart tools link graphics in your drawing so they respond to changes automatically. Create visual "what-if" scenarios with features like intelligent clip art & templates, automatic symmetrical objects, and dimensions lines. Auto-alignment, shape blending, powerful text handling capabilities, unlimited layers, color gradients, standard draw tools and more.

**GRA0354
Publisher: Aldus**

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UT010119 After Dark 2.0	29.
UT010231 More After Dark/After Dark 2.0 Bundle	45.
Casa Blanca Works, Inc.	
UT010273 Drive 7.2.2	49.
CE Software	
UT010048 DiskTop 4.0	63.
UT010213 Tiles	69.
Connectix	
UT010297 CPU Connectix PowerBook Utilities	49.
Dantz Development	
UT010246 DiskIt Pro	74.
UT010227 Retrospect 1.3	147.
UT010196 Retrospect Remote	264.
Essential Software	
UT010292 Easy Alarms 2.0	65.
UT010284 Easy Alarms 2.0 10-user	325.
FWB, Inc.	
UT010259 HardDisk Tool Kit 1.1	125.
Insight Development	
UT010098 MacPrint 1.3	95.
Insignia Solutions	
UT010174 AccessPC 2.0	60.
Kent Marsh	
UT010212 FolderBolt	75.
MicroCam	
UT010093 Vrex 3.6	69.
MicroMat	
UT010285 MacEKG 2.0	99.
Salient	
AutoDoubler or DiskDoubler 3.7	ea.49.
Symantec Corporation	
UT010151 Norton Utilities for the Mac 2.0	95.
UT010214 Norton Antivirus for Mac 3.0 (SAM)	65.
LNK0051 THINK C 5.0	199.
Teknosys	
UT010251 Help 1.02	89.
UserLand Software, Inc.	
UT010272 UserLand Frontier	189.

WORD PROCESSING

Caere	
UT010202 OmniPage Professional	649.
Calera	
UT010215 WordScan	189.
Claris	
WRD00026 MacWrite II 1.1	89.
Microsoft	
WRD00050 Word 5.0	295.
UPG0001 Word 5.0 Upgrade	125.
Sensible Software	
SPL0018 Sensible Grammar 2.1	55.
Softsync	
WRD00057 ExpertWriter	29.
TGS Systems	
LNK0053 Prograph 2.5 Compiler Ver.	309.
T/Maker Co.	
WRD00051 WriteNow 3.0	159.
WordPerfect	
WRD00041 WordPerfect 2.1	289.
WordStar	
SPL0030 American Heritage Electronic Dictionary	55.
SPL0028 Correct Grammar 3.0	49.
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BND0102 WordStar Correct Bundle	99.

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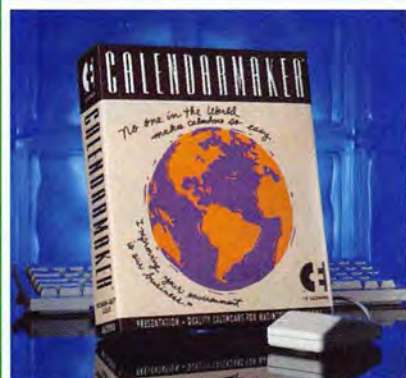
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CalendarMaker

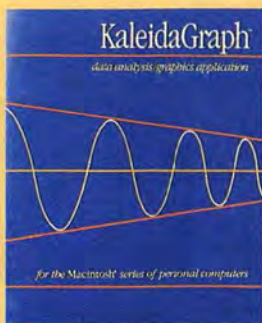
For creating presentation-quality calendars - from dignified corporate calendars to beautiful personal calendars - quickly and easily. These professional calendars can be printed to the ImageWriter®, laser printers, and even to files for inclusion in page layout programs. Choose from three different calendar types: pictorial, full page (tall or wide) or two months to a page. Date boxes hold up to 254 characters of text to be centered, left or right justified. Easy setup of preferences for page style, text style, monthly pictures, printing colors and monthly icons. Import graphics, add color, even highlight important dates with personalized icons and floating notes. It's a must for anyone who publishes, creates or uses monthly calendars. GRA0070

\$31

From QuickKeys™ and DiskTop™ adding power to your desktop, to QuickMail™, helping you to communicate regardless of platform. We can help you do whatever you do, better. How do we know this? Simple.

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Publisher:



KaleidaGraph 2.1

Analyze and present complex data the easy way... KaleidaGraph simplifies the process of analyzing and presenting statistical information. Provides increased productivity for the engineering, scientific, and business user who analyzes large amounts of data. Also imports data and allows the user to mathematically analyze it. KaleidaGraph provides 16 different graph structures, including scatter, histogram, probability plot, polar, as well as more common types, such as line, bar, and pie. You can crunch large amounts of data (up to 32,000 points per column), and plot up to 20 variables at once. Supports PostScript compatible printers including the DeskWriter C. Publisher: Synergy STA0018

\$149

The UnMouse

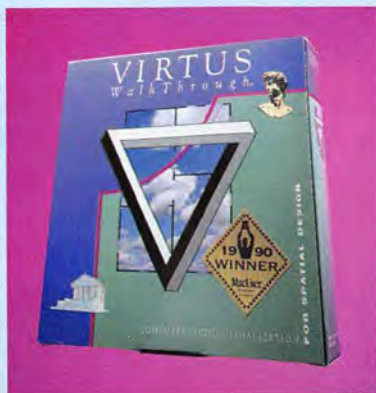
The UnMouse does everything a mouse can—only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. Manufacturer: Microtouch INP0084

\$159

Virtus WalkThrough 1.11

The latest version of this award winning 3-D drawing program provides everything you need to quickly capture and explore your ideas in 3-D. The intuitive interface and complete set of drawing and presentation tools make Virtus WalkThrough ideally suited for designers of all types including graphic artists, architects, space planners and theater and film professionals. Multiple windows and extensive drawing aids provide an interactive environment for editing and viewing your ideas. Interactive 3-D presentations, QuickTime® and PICS animated movies, and perspective pictures dazzle your audiences. Enhanced data exchange capabilities include: Imports of 3D DXF and trace layers for PICT, Claris® CAD and MacDraw; Exports of 2D DXF, 3D DXF, PICT, EPS, Claris® CAD and MacDraw. Winner of MacUser breakthrough Product of the Year Award 1990. Publisher: Virtus Corporation GRA0278

\$309



After Dark/More After Dark Bundle*

After Dark 2.0 displays over 35 screen savers including the classics, such as Flying Toasters and Fish!. Also features sound, password protection, MultiModule, logo and message display. UT10119 \$29.

It's MAD!! It's More After Dark - Over 25 incredible displays for After Dark, the Ultimate Screen Saver. Features contest winners; Mowin' Man, Tunnel, GraphStat, many beautiful new Fish!, Kittens, Art Museum, and Lunatic Fringe game module help save you screen form phosphor burn-in. (Requires After Dark.) Publisher: Berkeley Systems UT10230 \$25.

More After Dark Bundle

Buy both and save. UT10231

\$45*

M.Y.O.B. 3.0

M.Y.O.B., winner of the Macworld World-Class Award (1991 and 1992), is a fully-integrated, small business accounting software program containing G/L, A/P, A/R, Checkbook, Inventory and Card File. M.Y.O.B. is extremely powerful yet easy to set up and use.

Command Centers are arranged in a flowchart form making the program unlike all others. Version 3.0 features: Importing, Backorder Tracking, Increased Password Protection and more. Publisher: Teleware, Inc. FIN0087



\$139

MacGolf Classic 1.1

MacGolf Classic v1.1 challenges one to four players to match their skills against sand and water traps, deep roughs, winds, and undulating greens. Six tough courses are brought to life with full screen color graphics, five enlargement options, and digitized sound effects. Control your stance, ball position, shot direction, swing power, and club choice. Supports honors between holes and allows hard disk installation. System 7 compatible (except PowerBook and Quadra). Publisher: XOR Corporation ENT0274

\$52



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MacEKG 2.0

MacEKG can warn you of computer failure BEFORE it happens. EKG monitors over 250 aspects of your system—logging and comparing results each time you reboot. EKG features advanced chip-level tests that were only available to Authorized Apple Technicians until now. Using EKG's Reactivator to continuously reboot simulates several days of heavy use to quickly diagnose intermittent failures. EKG can automatically run at startup or shutdown—making sure you are the first to know if your computer has failed a test or slowed down.

Publisher: MircoMat UT10285



\$99

Dynodex or DynoPage

Dynodex is the fastest, most full-featured contacts manager for the Macintosh. Gives you speedy access to all your contacts on your PowerBook and completely personalize your address book in printed form. Both the DA and application versions are included. You can print double-sided address book pages to our DynoPaper or print Rolodex cards, envelopes, labels or any other custom form. MacWEEKs Target Award Winner for Best Contact Management Software. BUS0101 \$75.

DynoPage™ lets you print any Macintosh file to any page size, including pages for your personal organizer. Carry printed graphs, reports, daily "To-Do" lists, spreadsheets or any Mac file with you! This System 7-Savvy version also lets you create "instant booklets" by simply printing and folding your sheets. Over 100 layouts are included. Publisher: Portfolio Systems DTP0055

\$75



MacPrint 1.3

Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIsx and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript.
Cable is included. Publisher: Insight Development UT10098

\$95



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Create job-winning résumés quickly with RésuméExpert. 10 editions available by profession. Each edition features 40+ professionally written and fully-formatted résumé templates.

Simple to use - just select a template and enter your own information. Now compatible with MS Word, MacWrite II and WriteNow. MacUser 10/89 awarded RésuméExpert 4 mice and raved about its "excellent" manual and writing tips. Also rated a top 200 software program by MacUser 12/89.

Publisher: A Lasting Impression BUS0087

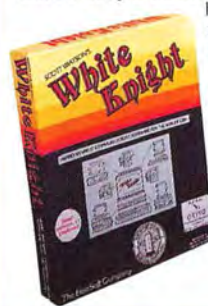


\$49ea.

White Knight V.11

The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991.

Publisher: FreeSoft COM0060



\$85

Design Your Own Home:

Design Your Own Home: Architecture, Interiors, or Landscape. Create floor plans, elevations and building plans with structural details that you can hand right to your contractor. Do individual room plans and kitchen/bath designs. Then complete your dream house with graphic landscape plans. Interiors and landscape programs generate 4 side views from top-view perspective. Sample plans are included.

Publisher: Abracadata

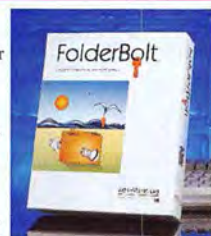
\$59ea.



FolderBolt

Folderbolt protects your folders (including your System Folder) with a password. Create completely locked folders, read-only folders, or password-protected drop box folders. No one without the password can open, duplicate, delete, or move them. FolderBolt can unlock all your folders at once and re-lock them on shutdown. It also generates a complete audit trail of failed attempts. Combine FolderBolt with other security products from Kent Marsh, Ltd. for comprehensive protection second to none. System 7 compatible. Publisher: KentMarsh, Ltd. UT10212

\$75



FileGuard or MaccessCard Reader*

FileGuard "It's about as much software-based security as you can get in one package." MacUser, March 1992. Protect your hard drive from unauthorized access (including security bypass with a system diskette), copying and erasure; applications and file folders (including System folder) from unauthorized access, deletion, and/or illegal copying; desktop from alterations by unauthorized users. Single UT10135 \$139.

MaccessCard Reader is a convenient security add-on for your Mac. Forget about passwords. Working with FileGuard, it controls access to a Mac using magnetically-stripped cards. Two cards come with the system but you can quickly train it to recognize any ID or credit card. Publisher: ASD Software ACC0539

\$295*

Turbo Mouse® 4.0

The "next generation" of Kensington's award-winning Turbo Mouse® trackball. Advances in trackball technology give you smoother, superior cursor control. Introducing the Brilliant Cursor™ command, it lets you automatically jump to user-defined areas on screen. Other new software features include advanced acceleration and "enhanced mouse button" commands, plus other user-programmable features. You can even save different sets of commands or different applications and different users. With an improved design, the Turbo Mouse hardware includes a large ball for greater control and smoother movement, and comfortably positioned buttons with a light, easy-to-click feel. Two Apple Desktop Bus (ADB) connectors let you chain other input devices. Fully System 7 and A/UX compatible. Limited Lifetime Warranty. Manufacturer: Kensington INP0060



\$109

POWER USER SIMMS ONLY

\$39*



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STEP-BY-STEP
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A Power User Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave a letter open while you refer to last month's sales figures.

You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ \$39 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 150ns or faster
2 MB	Remove all four existing 256k SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
4 MB	Install two 1 MB SIMMs.
To upgrade a 2-socket Mac LC II to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs.
To upgrade a 8-socket Mac II, IIx, IIcx, IIcx or SE/30 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 120ns or faster
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1 MB SIMMs.
To upgrade a 4-socket Mac IIsi to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 100ns or faster
5 MB	Install four 1 MB SIMMs.
To upgrade a 4-socket Quadra 700 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
8 MB	Install four 1 MB SIMMs.
To upgrade a 16-socket Quadra 900 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
4 MB	Install four 1 MB SIMMs.
8 MB	Install eight 1 MB SIMMs.
12 MB	Install twelve 1 MB SIMMs.

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is \$39.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just \$3.

CHP 0012 120ns SIMMs.....\$39

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MACWAREHOUSE

30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

* SIMMs prices vary. Call for latest information.

** Limited Offer! Free video with purchase of 2 or more SIMMs.

7 GREAT REASONS

1 Finder 7

The new Finder 7 is worth the cost alone. Access, organize, and view your folders, documents and applications faster and easier with the new improved finder.

2 Balloon Help

Use the new Balloon Help for interactive help while you work. Turn this feature on and point to anything on your screen - a menu item, icon, or tool - and a "balloon" appears, telling you what it is and what it does.

3 File Sharing

With the new File Sharing features you can share hard drives, folders, and files, with others on your network; it has never been easier. You can even set passwords so that only specific individuals or groups can see your files and work with them.

4 Fonts in System 7

Apple's new advanced font technology gives you clear, crisp type on screen in any size plus the ability to print to many different kinds of printers. No more struggle with font compatibility.

5 Multitasking

With System 7 Multitasking is always optional. Now you can run multiple applications at the same time, and switch from one to another with a click of the mouse. System 7 also supports background processing, so that while you're working in your word processor, you can print a document and have your spreadsheet recalculating.

6 System Folder Simplicity

Apple has completely redesigned and improved the System Folder, making it much easier to organize. Predefined subfolders are created automatically, to reduce clutter. The new System Folder includes a Control Panel Folder, Extension Folder, Apple Menu Folder, Preference Folder and Startup Folder.

7 Publish and Subscribe

You can "publish" any part of your document (a graphic, chart or piece of text), to another document even in another application - which "subscribes" to the original. Any changes you make to the original document will automatically appear in the other, even across a network. Now that's live copy and paste!

Plus Your FREE System 7 Tutorial from MacWAREHOUSE!

Video, sound, and animation on your Macintosh

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac!

GRA0347

Publisher: Apple Computer, Inc.



\$169

Macintosh PC Exchange

Open PC files on 3.5" MS-DOS and Windows-formatted floppy disks. Read DOS files on your Mac desktop. Open, save, rename, move, copy and delete documents just as if they were Mac files! Customize the program for even faster access. Requires Apple SuperDrive or compatible.

COM0126

Publisher: Apple Computer, Inc.



\$69

EXCITING NEW APPLICATIONS THAT TAKE FULL

AccessPC 2.0

With AccessPC 2.0, your Macintosh can make MS-DOS files look just like Mac files, instantly. Pop any DOS floppy in your drive, and in a couple of clicks, the PC files are on your Mac desktop, looking and acting perfectly Mac-like. Edit, copy, save, print, play with the numbers, print again, and give the PC people back their diskette. It's that easy to use any PC file in any Mac application.

AccessPC is an easy-to-install control panel utility that's always been completely compatible with System 6 & 7.

Publisher: Insignia Solutions
UTI0174



\$60

DiskFit Pro

Fast, efficient, easy backup. For Finder-readable backup to floppies, cartridge or other hard disks, get DiskFit Pro. DiskFit Pro copies files from a hard disk to a "SmartSet" of floppies, and then updates that "SmartSet" with each subsequent backup. By replacing only the obsolete files in the backup set, DiskFit Pro keeps your SmartSet from growing every time you back up. Backups stay fast and backup sets compact. And since files stay in Finder format, retrievals are a breeze. Don't leave your data at risk, backup with DiskFit Pro. System 7 Savvy, System 6.x compatible.

Publisher: Dantz Development
UTI0246



\$74



SAM 3.0 or NUM 2.0*

SAM 3.0 detects viruses by monitoring the suspicious activities that characterized them. Version 3.0 has enhanced update and repair capabilities, faster scanning, and more. The CDEV portion operates during normal Mac usage, and offers a number of options for checking disks and folders as you work. UTI0214 \$65

NUM 2.0 combines and integrates two outstanding collections of Mac utilities: SUM 2.0/NUM 1.1 plus automatic backup, data security (both DES and FastCrypt), and many productivity enhancements. Other utilities recover lost or accidentally deleted files, restore crashed hard disks and more. Publisher: Symantec
UTI0151

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TO UPGRADE NOW!

System 7 brings dynamic new capabilities and ease of use to everyone who uses a Mac...

System 7 builds on the Mac basics you already love, and paves the way for a whole generation of powerful new software. A simple click of the mouse installs the software. Then advanced features take over, letting you work faster, easier, and more productively.

- Multitasking provides effortless switching between applications
- Finder 7 lets you customize your desktop to the way you work
- File Sharing allows access to any folder and its contents among workgroups
- Publish & Subscribe lets you update several documents by only changing one
- TrueType gives you crisp, clear type of any size

And that's just for starters!

Now it's easier than ever to get System 7 up and running on your Mac, because you can get it right from MacWAREHOUSE! Join the generation of System 7 power users!

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System Software for the Apple® Macintosh®

System 7 brings a new world of power, ease of use, and versatility to every Macintosh personal computer.



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**System 7
Personal Upgrade Kit**

SYS0001

Publisher: Apple Computer, Inc.

**System 7
Group Upgrade Kit**

SYS0002

\$279

System requirements: 2MB RAM; hard disk drive.

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Make System 7 even easier with this Personal Training Systems System 7 Tutorial!

Get up and running with System 7 in a flash! This Personal Training Systems Tutorial is the fastest, easiest way to put all the power of System 7 right to work on your Macintosh desktop. And it's yours FREE* with your order for any product from MacWAREHOUSE! Just ask for item #AAA0021 when you place your order.

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Personal Upgrade Kit

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac! GRA0347 Publisher: Apple Computer, Inc. **\$169**

AppleTalk Remote Access

Gain direct access to information and resources from your AppleTalk network. Simple to set up and use. High performance is optimized for a broad range of modems. Provides multiple security levels, and requires only System 7 and a high-speed modem. No special hardware required.

COM0131 Publisher: Apple Computer, Inc. **\$175**

AppleShare 3.0

Connect up to 120 users using a variety of cabling choices. New version offers faster server start up, improved integrity and error handling, plus the ability to mount and unmount removable media while the server is running. NET0250 Publisher: Apple Computer, Inc. **\$1059**

ADVANTAGE OF THE POWER OF SYSTEM 7!

CIRCLE 156 ON READER SERVICE CARD.

MUJ2A

UserLand Frontier

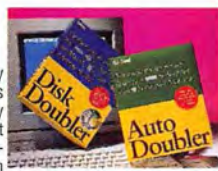
Frontier is the power user's scripting system for System 7. Write and run your own utilities to customize the Mac file system, networks and applications. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When your done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop. Publisher: UserLand Software UT10272



\$189

AutoDoubler or DiskDoubler 3.7

AutoDoubler is the easiest way to increase hard disk capacity. It's lightning quick and completely transparent, so it won't interrupt your work. The new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. UT10254 \$49.



DiskDoubler 3.7 gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. Combined they give you the ultimate in speed, convenience, and control. System 7 Savvy! Publisher: Salient UT10179

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Word 5.0 or Excel 4.0

Microsoft Word 5.0 simplifies word processing, whether you need to dash off a quick memo or create a complex report. Its Ribbon control panel makes changes with a single mouse click. Includes a grammar checker, spelling checker and thesaurus. WRD0050 \$295.



Publisher: Microsoft BUS0223 MICROSOFT EXCEL 4.0 UPGRADE ONLY \$99! UPG0310

Microsoft Excel 4.0 streamlines the tasks of creating and using a basic spreadsheet. Fully System 7 Savvy, it now allows you to include QuickTime audio/video clips in your spreadsheets. Wizards (Excel's on-line assistants) walk you through complex tasks.

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what you pay for.**

If you're using an everyday laser printer to produce your company's brochures, reports, or newsletters, the results will be less than professional. What should you do? If professional image-setting equipment is beyond your means or repeated trips to your friendly neighborhood service bureau are a scheduling nightmare, try a high-resolution solution.

The last two times MacUser Labs tested high-resolution PostScript-compatible laser printers (see "Practically Perfect Printing: High-Resolution PostScript Printers," February '92, page 172, and "The Letter-Perfect PostScript Printer," October '90, Buyer's Guide page 4), our choice for best heavy-duty production-environment printer was the Varityper VT600. Its reign, however, is coming to an end. There's a new king of the high-resolution hill: the Du Pont Plain



Figure 1: The Du Pont Plain Paper Imagesetter 600 prints brilliant images in record time.

Paper Imagesetter 600.

The Plain Paper Imagesetter 600 — more commonly and conveniently known as the PPI 600 — is a 600-dpi 12-ppm workhorse that produces some of the sharpest letter- and tabloid-sized output we've ever seen. A Motorola 88000 RISC (reduced-instruction-set computing) processor enables the PPI 600's Hyphen PostScript-clone RIP (raster image processor), housed in a unit separate from the printing engine, to process complex images faster than any of its competitors' RIPs can. The PPI 600 features auto-sensing serial, parallel, and LocalTalk ports, a real plus for multiplatform environments. This power and precision isn't inexpensive: The heavy-duty PPI 600 has an equally heavy-duty price tag of \$18,990.

Good and Fast

The PPI 600's image quality is more than sufficient for producing camera-ready art for low-

to-medium-resolution offset printing. Text is crisp and sharp, and 85-to-105-lpi halftones are clear, without sacrificing subtle shades of gray (see Figure 2). However, if you need 133- or 150-lpi halftones, a higher-resolution — and very expensive — imagesetter is required.

If the first criterion for a high-resolution printer is image quality, speed is a very close second — especially in a production environment (see Figure 3). Our tests showed the PPI 600 to be very swift indeed — even faster than the speedy Hewlett-Packard LaserJet III Si — at processing complex graphic images. This is especially impressive when you consider that the 600-dpi PPI 600, with its 12-ppm engine, has to process four times as much information as the 300-dpi 17-ppm III Si does.

The PPI 600 can process a page in two ways: *RIP-to-disk* and *RIP-on-the-fly*. With *RIP-to-disk*, the page is buffered on the



Ten high-resolution printers were profiled in our February '92 report ("Practically Perfect Printing: High-Resolution PostScript Printers," page 172).

PPI 600's internal hard disk, processed, and then printed. With RIP-on-the-fly, the PPI 600 prints the page while processing it. Its software estimates the complexity of a page and which method to use. The RIP-on-the-fly method speeds up simple text and graphic documents and can turn itself off if it cannot process a page with complex graphic images fast enough. Our graphics test page — easy to process in the beginning and extremely complex in the middle — confused the RIP-on-the-fly software, making it stop processing before the page was finished. Du Pont claims that new software, which should be available now, has fixed this problem.

On the Horizon

Du Pont will update the PPI 600 to the PPI 1800. The PPI 1800 interpolates a 900-x-900-dpi printer engine to achieve 1,800-x-900-dpi output, features a faster interface than its predecessor's, and will cost approximately \$25,000. Lexmark International (606-232-3000), a former division of IBM that manufactures printers under license from IBM, has introduced a true-600-dpi printer, the LaserPrinter 10A, for \$3,995. Xante (205-476-8189), known for its cost-effective upgrade boards for the LaserWriter series, has released its first printer, the 600-dpi Accel-a-Writer 8000, at \$4,495. NewGen Systems (714-641-8600) has added the \$5,995 TurboPS/880 to its line of high-resolution printers, using Image Enhancement Technology to achieve 800-x-400-dpi output. LaserMaster (612-944-9330) has introduced the \$6,995 Unity 1000 — its first printer that does not connect to the Mac through a NuBus card — with LocalTalk, serial, and parallel ports and an optional Ethernet

Figure 2: Gray-Scale Quality



Figure 2: A smooth gray ramp is a tough test of a printer's image quality, but the Du Pont Plain Paper Imagesetter 600 passed with flying colors. The Varityper VT600 showed only slightly greater banding (obvious transitions between gray steps) but took much longer to print. The Hewlett-Packard LaserJet IIISi showed clear bands — an unavoidable disadvantage of 300-dpi technology.

Figure 3: Overall Speed

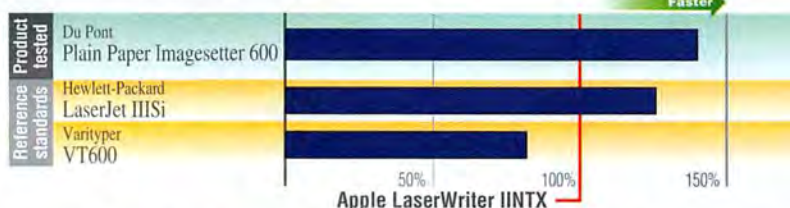


Figure 3: The Du Pont Plain Paper Imagesetter 600 is among the fastest printers we've ever tested, even though it must process four times as much information as does a 300-dpi laser printer. Although its 12-ppm engine can't keep up with the 17-ppm engine of the 300-dpi Hewlett-Packard LaserJet IIISi (the former overall speed champ) when printing a 30-page Word text document, it was faster than the IIISi in all other tests — producing a complex PostScript graphic, a 4.5-megabyte gray-scale image, and a multielement composite page — whose results we combined to produce an overall score. All results shown here are relative to those of an Apple LaserWriter IINTX.

port. LaserMaster uses its proprietary TurboRes technology to modulate a 400-dpi engine into 1,000 dpi in the horizontal and vertical directions.

The Bottom Line

The PPI 600 — fast, precise, and powerful — sets a new standard in the growing market of high-resolution printers. If your printing and production needs require camera-ready text or 85-to-105-lpi halftones, the Du Pont Plain Paper Imagesetter 600 can do the job.

— Paul Yi

Table 1: Features

Du Pont Plain Paper Imagesetter 600	
List price	\$18,990
Street price	\$17,250
Pros	Very fast. Excellent text and gray-scale output.
Cons	Very expensive. Lacks true Adobe PostScript.
Company	Du Pont Printing and Publishing Barley Mill Plaza #15 Wilmington, DE 19880 800-538-7668 302-733-9480

Inkjet Printers

New software gives Apple's StyleWriter a performance boost. But can it catch up to the Hewlett-Packard DeskWriter?

Low-cost high-quality inkjet printers provide quality printing to those of us who can't afford laser printers. Although laser-printer prices have fallen dramatically, so also have the prices of the two inkjet alternatives to lasers: the Hewlett-Packard DeskWriter and the Apple StyleWriter. Not only are they more affordable but their performance is also improving: Hewlett-Packard and Apple have each recently released new software that adds features and increases printing speed.

The DeskWriter's 300-dpi resolution, respectable speed, and support for AppleTalk made it an instant hit. It wasn't until Apple introduced the StyleWriter that the DeskWriter had some serious competition (see "Personal Best: Two New Apple Printers," May '91, page 90). The StyleWriter was small and light, its 360-dpi resolution made for



Figure 1: Head-to-head competitors: The Apple StyleWriter (left) has a slight edge in print quality, but the Hewlett-Packard DeskWriter wins hands down in printing speed.

beautiful output, and it retailed for only \$599. Unfortunately, it was numbingly slow, taking two minutes to print a single page of 12-point text.

Those two minutes per page could add up to a hefty chunk of time if you used your StyleWriter to do any serious quantity of printing. This resulted in a lot of unproductive idle time, because the StyleWriter — like the DeskWriter — didn't work with PrintMonitor, the background print spooler that comes with system software.

Diverse Drivers

Recently, the picture changed significantly. HP lowered the list price of the DeskWriter to \$599, and Apple cut the list price of the StyleWriter to \$399. Street prices are even closer: around \$350 for the StyleWriter and \$400 for the DeskWriter. Apple and HP also have released new *drivers* for their printers. (A

driver is a system extension that handles a Mac's communication with a particular type of printer.)

HP's new DeskWriter driver, version 3.1, is primarily a feature enhancement. It now provides a print-spooling feature and a page-preview function as well as improved gray-scale printing.

Apple's new StyleWriter driver, version 7.2.2, although primarily a performance release, lets the StyleWriter work with PrintMonitor, so printing can take place in the background. This new driver comes as part of System 7 Tune-Up version 1.1.1.

Productive Printing

We used a Mac IIci with the new driver and found that the StyleWriter was 40 to 60 percent faster than it was with the older driver (version 7.0) when printing a simple ten-page Word file or a MacDraw II graphics document, and it was 2.5 times as fast on a complex PageMaker



See the May '91 issue (page 90) to read up on the beginning of the StyleWriter/DeskWriter rivalry.

test page (see Figure 2). When it printed the text document from a Classic, the improvement was even more impressive — more than three times as fast. But regardless of which Mac model was tested, on our ten-page Word test — and text is what we expect that most people will use these printers for — the DeskWriter still maintains its performance edge: It churns out pages about twice as fast as the StyleWriter does.

But now that both printers work with PrintMonitor — available to System 6 MultiFinder and System 7 users — these time differences are less significant. Each printer makes you wait, but with simple documents such as our Word and MacDraw tests, you regain control of your Mac within seconds of clicking on the Print button.

From a print-quality standpoint, the StyleWriter's 360-dpi text has a clear edge over the text produced by the DeskWriter, particularly at small sizes (see Figure 3). With the DeskWriter's new 256-shade gray-scale capability — previously it could print only 16 — the image quality of the two printers is closely matched in output of gray-scale images such as scanned photos.

The Bottom Line

If you're in the market for an inkjet printer, get a DeskWriter. Although the StyleWriter's text output is a notch better, it's not worth the extra printing time, and street prices are close enough to eliminate cost as a factor. If you own either unit, get a new driver — today. The new StyleWriter driver is available from user groups, on-line services, and dealers or directly from Apple — it should be free or close to it. The new DeskWriter driver is available free; call HP.

— Henry Bortman

Figure 2: Printing Speed

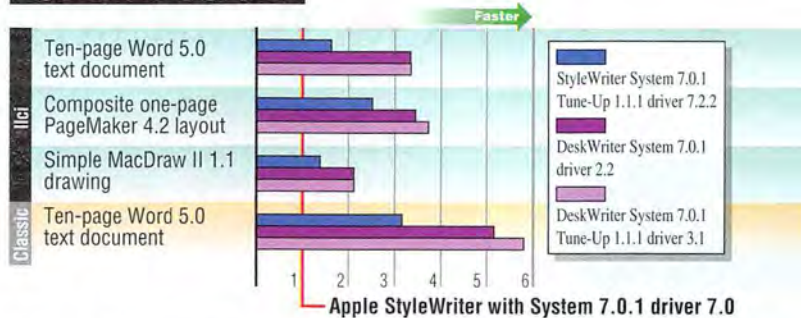


Figure 2: We connected a Hewlett-Packard DeskWriter and an Apple StyleWriter to a Mac IIfx and compared their performance, using each printer's new driver. We also ran tests with the older drivers. Although the StyleWriter's new driver offers significant improvements, the printer can't match the DeskWriter in terms of performance. We then connected the printers to a Mac Classic and retested them. Printing a Word document with the new StyleWriter driver is more than three times as fast as with its predecessor, but the DeskWriter is nevertheless nearly twice as fast as the StyleWriter. All results are shown relative to those of the Apple StyleWriter with System 7.0.1 driver 7.0.

Figure 3: Output Sample

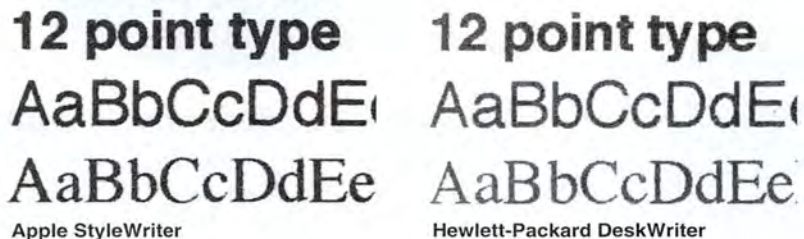


Figure 3: Each printer produces very good text, as these samples (at 2x magnification) show. The StyleWriter's 360-dpi resolution gives it a slight edge — but is such a tiny improvement worth nearly twice the printing time?

Table 1: Features

	Apple StyleWriter	Hewlett-Packard DeskWriter
	\$\$\$	\$\$\$
List price	\$399	\$599
Street price	\$350	\$400
Pros	Excellent output quality. Small footprint.	Excellent performance. Page-preview capability. Sharable on LocalTalk networks.
Cons	Still slow despite improved performance of 7.2.2 driver.	Large footprint. Ink warps page when printing large solid areas.
Company	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 408-996-1010	Hewlett-Packard Co. Direct Marketing Organization P.O. Box 58099, MS 511L-SJ Santa Clara, CA 95051 800-752-0900 408-738-8858 (driver upgrades)

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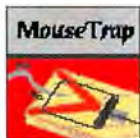
By Aileen Abernathy

Uncalibrated color: Electronics for Imaging (EFI) has finally released Cachet, a \$395 color-editing package that lets anyone produce good-looking color images without calibrating monitors or learning a secret handshake. You simply match the screen appearance of a scanned photo to that of an already corrected reference image, using an ingenious point-and-click ap-



proach. No worries about monitor calibration or ambient light, because both images are on the same screen. A gamut alarm highlights unprintable colors, based on the selected output device, and color separations are optimized for the printing method (SWOP Matchprint, for example). Cachet's **not-so-secret ingredient** is EfiColor, a system-level color-management system that maintains color consistency from scanner to monitor to printer. 415-742-3400.

PageMaker piecemeal: Aldus promises that incremental rotation will be part of PageMaker 5.0, but Equilibrium (415-332-4343) has an interim Addition for the impatient. Rotate This! (\$49) twirls bit-mapped graphics (TIFF, PICT, and paint) in $1/1,000$ -degree increments. Alas, it can't handle EPS images or text. A second Equilibrium Addition, Import That! (\$149), enables PageMaker to directly import Photoshop, Pixar, and QuickTime graphics as well as non-Mac image formats such as BMP (Windows), GIF (CompuServe), PCX (DOS), and TGA (Targa). The Utility Company's MouseTrap, also \$149, is a stand-alone



utility that **traps PageMaker files**. You first save each page to disk as an EPS file and then open it in MouseTrap, which lets you select the objects you want to trap. Trapped files can be processed through PrePrint or Adobe Separator. 714-754-1087.

Faster, smoother: If you'd like 24-bit quality at 8-bit sizes, Fast Eddie's got a deal for you. This superslick \$169 utility, from Paradigm Concepts, reduces 24-bit images to one-third their original size — without compression — by creating optimized 8-bit images with colors closely matching those in the originals. 505-888-0112. Smoothie, from Peirce Software (408-244-6554), sounds like a **Lothario or loan shark**, but it's a \$149 utility for quickly removing (anti-aliasing) the jagged edges in drawings and presentation files. Although it's superficially similar to Ray Dream's JAG, Smoothie works only with object-oriented PICT images, such as those produced by Persuasion or MacDraw, and converted files are four to ten times as large as the originals. Smoothie does offer a batch-conversion mode, however, and it can turn groups of images into a QuickTime movie or a SlideShow file.





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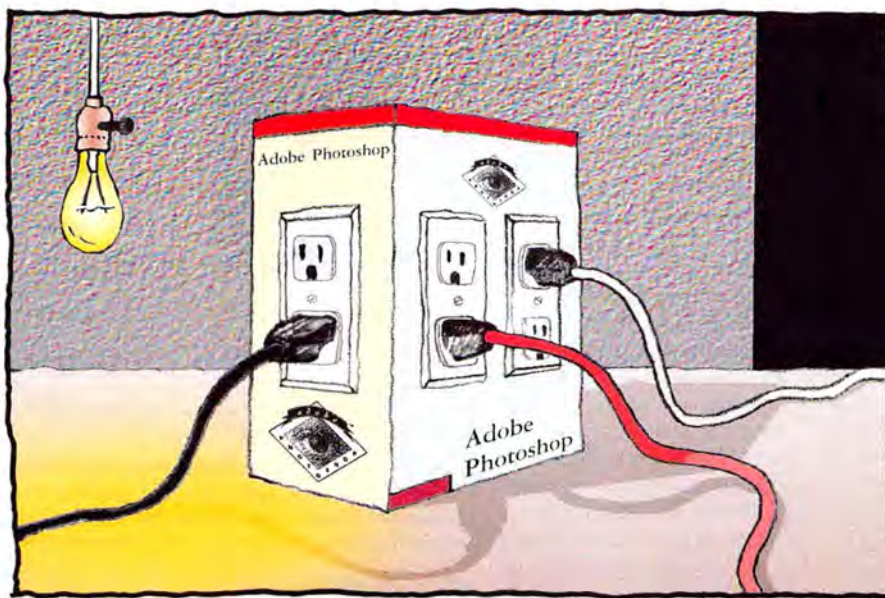
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Plugging In to Photoshop

Extending the capabilities of Photoshop — as well as SuperPaint, Painter, StrataVision 3d, and seven other programs — is a snap, thanks to the dozens of plug-in modules now available.

By Michael Roney



As the first monster application of the 1990s, Adobe's Photoshop defined a new level of sophistication and power for image processing on the desktop. And long before the Mac's system software went modular, Photoshop popularized the concept of plug-in modules.

These little add-on programs let Adobe and third-party vendors extend the capabilities of Photoshop without bulking up the main application. Plug-in modules provide links to scanners, printers, and video-capture cards; access to calibration and compression systems; special-effects filters; and more. Using a plug-in couldn't be simpler: You just drop it into the folder containing the Photoshop Preferences file, and when you next launch Photoshop, you have seamless access to the plug-in's functions from within the program.

But the real beauty of Photoshop's plug-ins is that they work with more than just Photoshop. In a classic case of "if you can't beat 'em, join 'em," many competing graphics vendors have adopted Photoshop's plug-in technology, making it the unofficial standard for increasing the power of Mac graphics applications. Programs that accept Photoshop plug-ins include Premiere 1.0, from Adobe; SuperPaint 3.0, from Aldus; Cachet 1.0, from EFI (Electronics for Imaging); ColorStudio 1.5 and Painter 1.2, from Fractal Design; Color It! 1.0, from MicroFrontier; QuarkXPress 3.1, from Quark; StrataVision 3d 2.5, from Strata; PixelPaint Professional 2.0, from

SuperMac; and Oasis 1.1, from Time Arts.

Photoshop's plug-in format is an expansion of an open specification that Silicon Beach Software (now a subsidiary of Aldus) developed in the late 1980s for Digital Darkroom and SuperPaint. Adobe has defined three types of plug-in modules: *Acquire* modules let you decompress a JPEG (Joint Photographic Experts Group) document or control scanners and video-frame-capture systems from within Photoshop. *Export* modules let you save images in file formats not normally supported by Photoshop, print images optimized for particular printers, and perform JPEG compression. *Filters* enable you to apply special effects to images. Certain applications support only some of these categories. For example, neither QuarkXPress nor Cachet supports special-effects filters.

Two dozen plug-ins come bundled with Photoshop, and third parties offer dozens more for Photoshop and its ten plug-in-savvy colleagues. This overview discusses what's available; for more information on specific products, see the *3rd Party Software Guide* that comes with Photoshop or contact the companies listed in the "Directory" sidebar.

Hardware Links

The largest (and least exciting) group of plug-ins are the acquire and export modules that come bundled with scanners, video-digitizing systems, printers, and film recorders.

Scanner plug-ins, which let you scan

images directly into Photoshop, are the most common acquire modules (see Figure 1). Scanner modules are great time-savers, because you don't have to leave the program to make a scan or save your scanned image in a universal graphics format to work on it. With Quark's new Plug-In XTension, for example, you can use a Photoshop plug-in to drive a scanner from within QuarkXPress and place the resulting scanned image directly into a page layout. Nearly every scanner manufacturer except Hewlett-Packard bundles a Photoshop plug-in with its products.

The number of acquire plug-ins for video-digitizing systems is on the upswing, thanks to the advent of QuickTime and Photoshop's increasing popularity in television, film, and desktop multimedia production. Companies such as Advent Computer Products, Canon, Computer Friends, Mass Microsystems, and Nikon offer plug-in interfaces that let you bring video images directly into Photoshop.

Diaquest goes beyond simple video capture with its DQ-Animaq board and plug-in, a professional system that lets you bring a video frame into Photoshop, add a special effect, and then save it as a PICS file or record it to videotape. When you use DQ-Animaq with a macro generator such as QuicKeys, you can automate the process over a range of frames, a technique called electronic rotoscoping. The plug-in lets you precisely control the frame origin and destination as well as the capture and record rates.

Export modules for printers and film recorders are less common. Eastman Kodak, Nikon, and RasterOps are among the companies that offer printer plug-ins. For example, Eastman Kodak's plug-in module for the XL7700, its high-end color printer, optimizes certain Photoshop

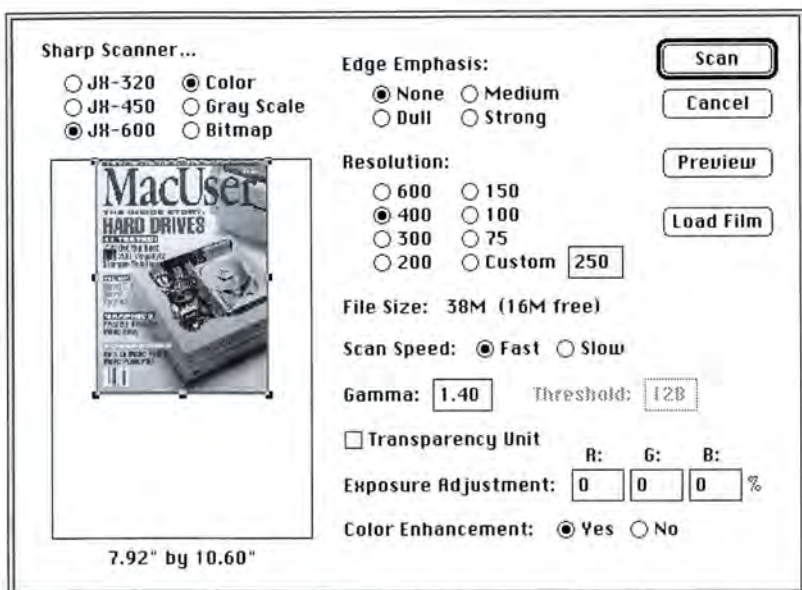


Figure 1: Scanner drivers, such as this one for the Sharp JX-600, are common Photoshop plug-ins. By selecting the driver from the Acquire submenu, you can preview, adjust, and scan an image directly into any plug-in-savvy application.

features. A dialog box lets you adjust hue and saturation, check which colors in an image are printable, scale images to fit the output medium, or lighten or darken images by predetermined increments.

Special Effects

Want to add a rainbow or reflection to a mundane photograph? How about fracturing a person's face into five easy pieces or turning a boat scene into a watercolor painting? No problem.

Special-effects filters let you enhance or transform entire images or selected areas with just one or two mouse clicks. Whether you lack the requisite artistic skills or simply like instant gratification, special-effects filters can quickly turn

humdrum artwork into something special. Photoshop comes with around two dozen filters, some (Blur, Sharpen, Add Noise) built in to the main program and others (Lens Flare, Radial Blur, Solarize) bundled as plug-in modules.

Several companies have released their own packages of Photoshop special-effects filters, some of which boast a significant improvement to Adobe's filter interface: a preview window that lets you quickly see the effect the filter will have on an image before you render it.

Gallery Effects, developed by Aldus' Silicon Beach Software subsidiary, is the best-known series of filters. The first collection, *Classic Art*, provides 16 plug-ins that simulate traditional media: Chalk &

Directory

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619-942-0648 (fax)
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206-622-5500
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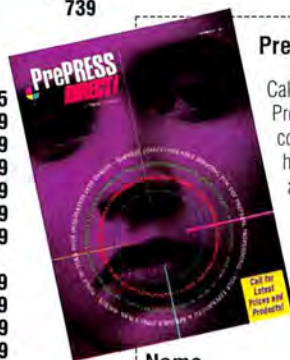


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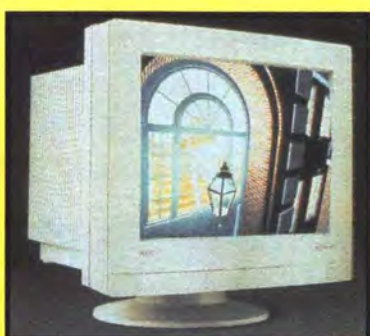
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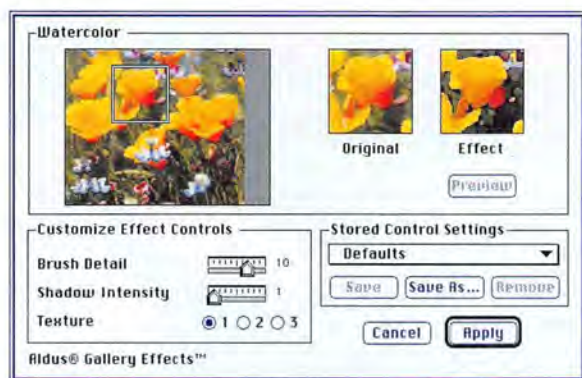


Figure 2: You can quickly turn a digital photograph into a painting with Aldus' Gallery Effects: Classic Art, which provides 16 special-effects filters that simulate traditional media, including this watercolor effect. The filters are easy to apply and customize, and a preview window lets you see the filter's effect before applying it to the actual image.

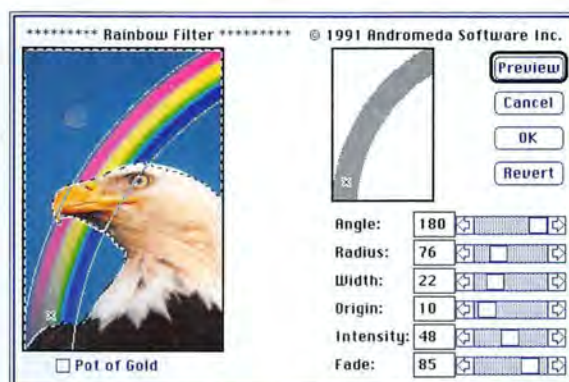


Figure 3: Andromeda's Series 1: Photography Filters provides optical effects — diffractions, motion blurs, rainbows, reflections, and stars. You can preview a filter's effect on the entire image, but the filters' effects don't supply the "wow" power of Aldus' Gallery Effects.

Charcoal, Charcoal, Chrome, Craquelure, Dark Strokes, Dry Brush, Emboss, Film Grain, Fresco, Graphic Pen, Mosaic, Poster Edges, Ripple, Smudge Stick, Spatter, and Watercolor. (Gallery Effects also is available as a stand-alone application for those who don't have a plug-in-compatible graphics program.)

The effects are easy to apply and can produce stunning results (see review, April '92, page 58). Each filter provides a dialog box that contains filter-specific controls, a thumbnail of the entire image, and a preview window for checking how the filter looks after it has been applied to a section of the image (see Figure 2). By experimenting with the controls, you can create countless variations of any effect, and you can save as many as 25 custom settings for each filter. You can create some interesting effects by applying filters to individual color channels. For example, you could use Graphic Pen just on

the red channel, Smudge Stick only on the green, and Chrome on the blue. You can also apply single or multiple effects to all or part of a PICS animation file with a bundled utility called Animator.

Gallery Effects' drawbacks are minor: The preview area is limited to a small portion of the overall image, and the effects take quite a long time to apply — adding the watercolor effect to a 1.1-mega-byte image took six minutes on a Iliac.

The latest Gallery Effects package, Texture Art, supplies 125 photographic-quality color textures of surfaces and materials, including brick, fabric, gravel, ground cover, marble, metal, roofing, stone, tile, walls, and wood. The textures, developed by Pixar, can be seamlessly tiled across any image or object; you can also open existing TIFF or PICT files for tiling. The tiled format means that the texture files themselves require only about 512K each. The basic package provides

the textures in 8-bit, 72-dpi TIFF and PICT formats on floppy disks and CD-ROMs. (The price wasn't set at press time but should be between \$200 and \$300.) The 24-bit, 300-dpi versions of the textures must be purchased separately; they can be ordered directly from Aldus or unlocked on the CD-ROM.

If you hanker for optical effects, check out Series 1: Photography Filters, from Andromeda Software, which also develops Streamline, Adobe's auto-tracing program. The 11 filters create reflections, diffractions, halos, rainbows, prisms, motion blurs, glowing stars, textures and patterns, multiple copies (for kaleidoscopic effects), and mezzo line screens for gray-scale images. One of the filters, cMulti, is bundled with Photoshop 2.0.

Like the Gallery Effects filters, the Andromeda filters are accessed through a dialog box with a preview window (see Figure 3). However, the Andromeda

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software lets you preview an entire image almost instantly, and the parameter controls are more extensive than in Gallery Effects. Applying an effect takes less than 30 seconds on a 68030 Mac, but the results are less spectacular than those you can get with Gallery Effects.

At press time, Andromeda was preparing Series 2: 3-D Special Effects, which will let you create 3-D perspectives without dedicated 3-D software. It contains geometric molds—including a sphere, cone, cylinder, and plane as well as a user-customizable shape—onto which you can wrap images and then look at them from different viewpoints.

Performance Resources created RazzaMaTazz Filters to provide the graphic effects favored by advertising agencies. The eight filters alter color values or image geometry (see Figure 4). Tremor supplies an earthquake effect; Fade darkens images; Modulus produces radically altered images with infrared or neon looks; RGB Swap switches the values of selected pixels between color channels; Sepia tints images an old-fashioned brownish gray; Split 128 creates a subtle posterized effect; Framemaker lets you create "moldings" through a multistep process; and Trig creates patterns based on user-specified values for the sine, cosine, and tangent.

We found the RazzaMaTazz filters less intuitive than the other packages', and although they do provide a potentially greater range of results, they require a bit more experimentation. Instead of providing detailed instructions and examples, Performance Resources exhorts users to "experiment, experiment, experiment." (They must not know about the time constraints most artists and advertising agencies work under.) The

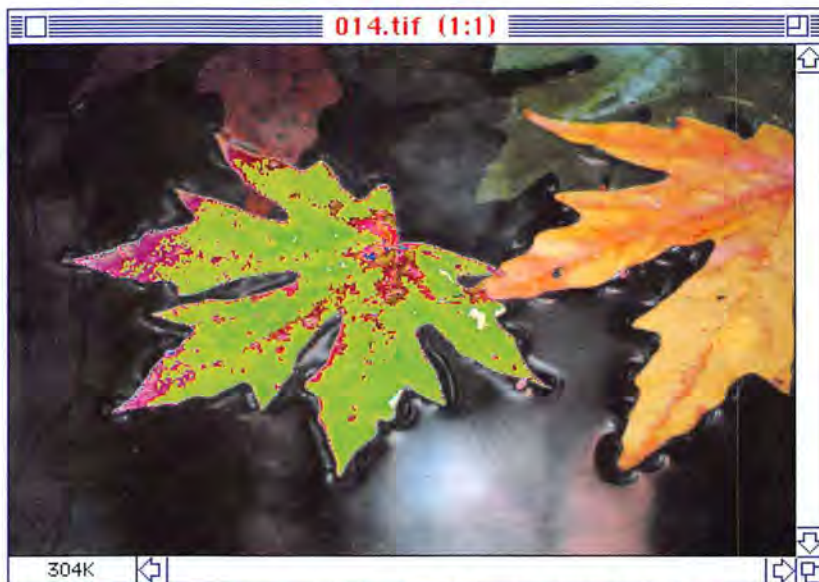


Figure 4: Creating a usable effect with RazzaMaTazz Filters is often a matter of trial and error. Here, the RGB Swap and Modulus filters were applied to a leaf.

filters have no preview windows, and only a couple have user controls. Each takes as much as 30 seconds to apply.

Speed Boosters

Photoshop's standard filters—Unsharp Mask, Sharpen, Gaussian Blur, JPEG Compression, Image Size, Rotate, and so forth—can take a long time to do their stuff. Spectral Innovations, Newer Technology, SuperMac, and RasterOps are addressing the problem by pairing special versions of computation-intensive filters with dedicated accelerator cards. If you regularly sharpen, blur, or compress images, the souped-up filters can make these operations up to ten times as fast as their Adobe counterparts, cutting your waiting time from minutes per operation to just seconds.

Lightning Effects, from Spectral Innovations, provides alternative plug-ins for 11 Photoshop filters, coupled with a DSP (digital signal processing) board. The plug-in software is available separately for those who already own a Spectral DSP board. Quadra and IIfx owners will be pleased to hear that Newer Technology offers both PDS (processor-direct slot) and NuBus versions of Image Magic, its DSP card/filter package.

SuperMac's ThunderStorm package contains two parallel DSP cards and alternative plug-ins for nine Photoshop bottlenecks. The company claims that its implementation produces results that more accurately match those of the Adobe filters. It may have a point—ThunderStorm was developed in collaboration with Adobe and Storm Technology, the

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foremost developer of JPEG-compression routines. Meanwhile, RasterOps is offering a similar board/filter package called ImagePro, which relies on RISC technology for its speed boosts.

Calibration

Assuring color consistency among scanners, monitors, and output devices is one of the greatest challenges in desktop publishing. Some companies — Pantone, TruMatch, and Focoltone — offer electronic versions of paper-swatch systems to solve the problem. Others, such as Radius, RasterOps, and SuperMac, sell monitor-calibration systems that employ optical sensors.

Several companies offer calibration setups that depend partly on Photoshop plug-ins. Such calibration systems have many similarities: They gather color information on specific scanners, monitors, and/or printers and calibrate the data with a device-independent color definition established by the CIE (Commission Internationale de l'Eclairage). The calibrated

color data is stored in a file called a *transform* or a *profile*. To apply the calibration data to a scanned or printed image, you select the appropriate image-correction filter.

Candela and Savitar, for example, supply scanner-calibration software based on Photoshop plug-ins. Candela's Scan-Cal system, which costs a hefty \$1,500, uses two plug-ins to gather and apply calibration data. To calibrate a scanner, you scan the supplied target with an acquire module called ScanCalAnalyze, which analyzes the scan, computes the necessary color correction, and stores calibrated values for both the gray-scale and the RGB modes. You can then apply the values to any scanned image with the

ScanCalExecute filter, which also lets you tweak highlights and shadows.

Savitar's ScanMatch operates almost exactly as Scan-Cal does — it includes an acquire plug-in for calibrating the scanner and a filter module for applying the corrected values — yet ScanMatch costs a mere \$149. The package includes a 24-color Pantone swatch sheet to use as a

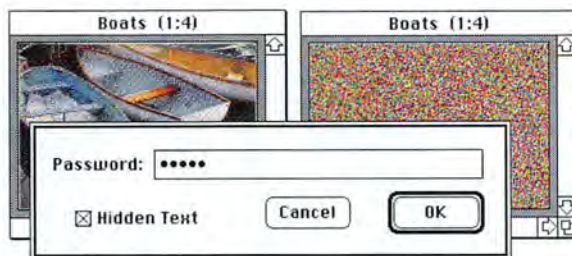


Figure 5: ColorCrypt, from Candela, lets you encrypt confidential images with one or more passwords. Scrambled images are displayed as electronic "snow" (right) and can be saved in any file format. To restore an image, you must enter the correct password(s). When Hidden Text is activated, passwords appear as dots.

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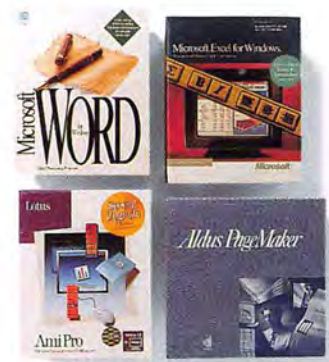
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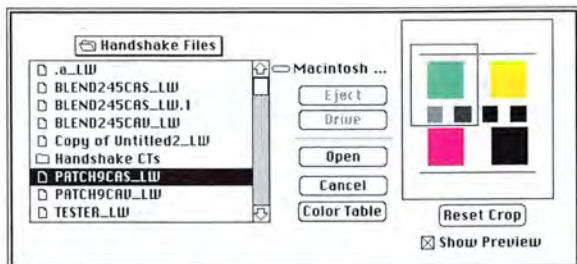


Figure 6: Using Total Integration's Handshake/LW, you can select a portion of a Scitex Linework file, open and edit it in Photoshop, and then merge the edited portion with the original Linework file. This allows you to make last-minute text and color changes to a Linework file without tying up a Scitex workstation.

target scan. Calibration is based on Tektronix's TekColor color-management system, so the TekColor extension and a variety of precalibrated monitor profiles are included in the package.

Candela also offers PrintCal•PI, which lets you build calibration tables for printers. A trimmed-down version of a stand-alone program, it has plug-ins that supply

complete color-management systems, and both have Photoshop tie-ins.

The Kodak Color Management System (KCMS) is a developer-level approach that must be implemented by individual vendors. The first KCMS-based product to reach the market is the RasterOps CorrectColor Management System. It consists of color-management

a test pattern, figure the correction, and apply the calibrated values to images.

A truly comprehensive solution to the color-consistency problem, however, requires electronically calibrating the entire production chain — scanner, monitor, and printer — at the system level. Two companies, Kodak and EFI, are offering the first

software, a set of device profiles, the CorrectColor Calibrator (an optical-sensor system for calibrating monitors), and three Photoshop plug-ins for color-correcting images — Scanner-to-Monitor, Print Preview, and Monitor-to-Printer. A NuBus accelerator board called the Precision Color Transformation Engine is an option that makes the system 60 times as fast, according to RasterOps.

EFI plans to offer two Photoshop plug-ins as access points for EfiColor, which is an impressive-looking color-management system that presents KCMS with some serious competition. Details had not been finalized at press time, but current plans call for an acquire plug-in that lets users select which scanners and printers to calibrate and an export plug-in for saving color-corrected files. The pair of plug-ins should cost less than \$200.

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(3 x 4 inch) 24-bit-color file scanned at 300 dpi takes up more than 3 megabytes of disk space. Larger color files can hog as much as 100 megabytes apiece.

Luckily, companies such as Storm Technology and Radius offer extremely

efficient file-compression hardware and software that use algorithms developed by JPEG. JPEG compression can reduce files from a tenth to a hundredth of their original size without any perceptible loss of quality. These companies also market

plug-in modules that provide rapid image compression and decompression from within Photoshop, supplementing — and often improving upon — Adobe's JPEG and LZW routines.

At first glance, Storm Technology's PicturePress 2.0 plug-ins look similar to Adobe's own JPEG-compression and -decompression modules. Both are available from Photoshop's Acquire and Export submenus, and both offer varying levels of compression. But there are key differences. PicturePress has an optional hardware accelerator that greatly enhances performance. Adobe's software-only JPEG implementation is slower but has two advantages: First, it's the only product that can compress CMYK as well as RGB images. Second, it can save compressed files in EPS format, which can be placed — still compressed — in a page layout and automatically decompressed inside a PostScript Level 2 printer. This technique is much faster than sending uncompressed files to the printer.

The chief claim to fame of Radius' ImpressIt plug-ins is their very fast software-only compression.

Compression is much faster when some of the work is done in hardware. Advent Computer Products' Neotech Image Compressor board and plug-in module is designed to compress a 2-megabyte file to 200K in less than a second, with no loss of quality. Storm's StormCard can accelerate PicturePress compression by 10 to 30 times. And as mentioned, RasterOps, Spectral Innovations, and SuperMac offer board/plug-in combinations that speed up JPEG decompression.

Alone in Their Class

As if all this weren't enough, there are several new, one-of-a-kind modules that further enhance Photoshop and other plug-in-savvy programs.

Fast Eddie, from Paradigm Concepts, can cut 24-bit images to one-third their original size — *without* compression. The secret? It exchanges the 24-bit palette for an optimized 8-bit one, using a special algorithm developed at Los Alamos National Scientific Laboratory. A pair of plug-ins lets you perform the conversion either on existing images or on the fly during scanning.

If you work with confidential images, you can protect them from prying eyes with Candela's ColorCrypt plug-in, which provides multiple levels of image encryption by using a personal-password scheme

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(see Figure 5). Encrypted images are displayed as electronic "snow" and can be saved in any file format. When you re-open an encrypted image, you reselect the plug-in and enter the password; the image is then reconstructed. You can encrypt the image to deeper levels by repeating the process, using a new password each time. ColorCrypt lets you encrypt an RGB image in one pass, but for other color modes, you must encrypt each channel individually.

Total Integration is bringing the abilities of Scitex systems to the Mac through a series of Photoshop plug-ins. Photoshop can open Scitex CT (continuous-tone) files, but it can't handle Scitex Linework (page geometry) files. Handshake/LW solves that problem, allowing you to open all or part of a Linework file in CMYK format, edit it, and then resave it in Linework format (see Figure 6). This allows you to make last-minute text and color changes without tying up a Scitex workstation. Combine/CTLW can merge Scitex CT and Linework files into a single Photoshop CMYK file, which can then be proofed on a color printer such as the Iris Ink Jet Proofer. Iris owners will want Iris/CT, which lets you edit CMYK files from the Iris FEP (Front End Processor). All Photoshop formats can be saved to the Iris FEP format.

The MacCompress package, from NDC (National Digital Corp.), lets you receive stock color photos by modem from seven top stock-photo agencies. MacCompress includes the ZTerm telecommunications program; Tiff Maker, a utility that decompresses received images (which are sent in a proprietary compression format) into usable TIFF files; and a plug-in that can decompress files on the fly when you import them into Photoshop. MacCompress+ lets you recompress files into NDC's proprietary format when you've finished with them.

Kodak has developed a plug-in that lets Photoshop users access images directly in the new Photo CD format. The plug-in allows you to preview and crop an image and adjust its color balance in any of the five Photo CD resolutions before opening the image. At press time, however, Kodak had not decided whether the Photo CD plug-in would be bundled with Photoshop, sold as a stand-alone utility, or included with its Photo CD Access utility.

The plethora of plug-in modules attests not only to Photoshop's irresistible power

but also to the trend toward modularity in the way we use software. Applications are becoming increasingly flexible, allowing us to add and subtract elements to suit our needs rather than forcing us to tailor our work habits to the software.

And wasn't that the original idea behind the Mac? ☺

While waiting for his TIFF files to open, Michael Roney does developmental editing of computer books for Bantam Electronic Publishing.

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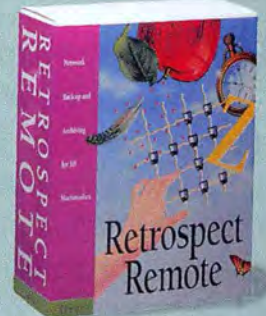
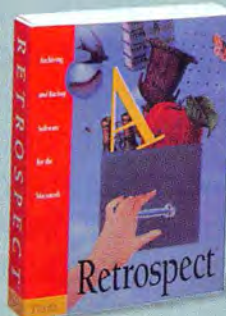
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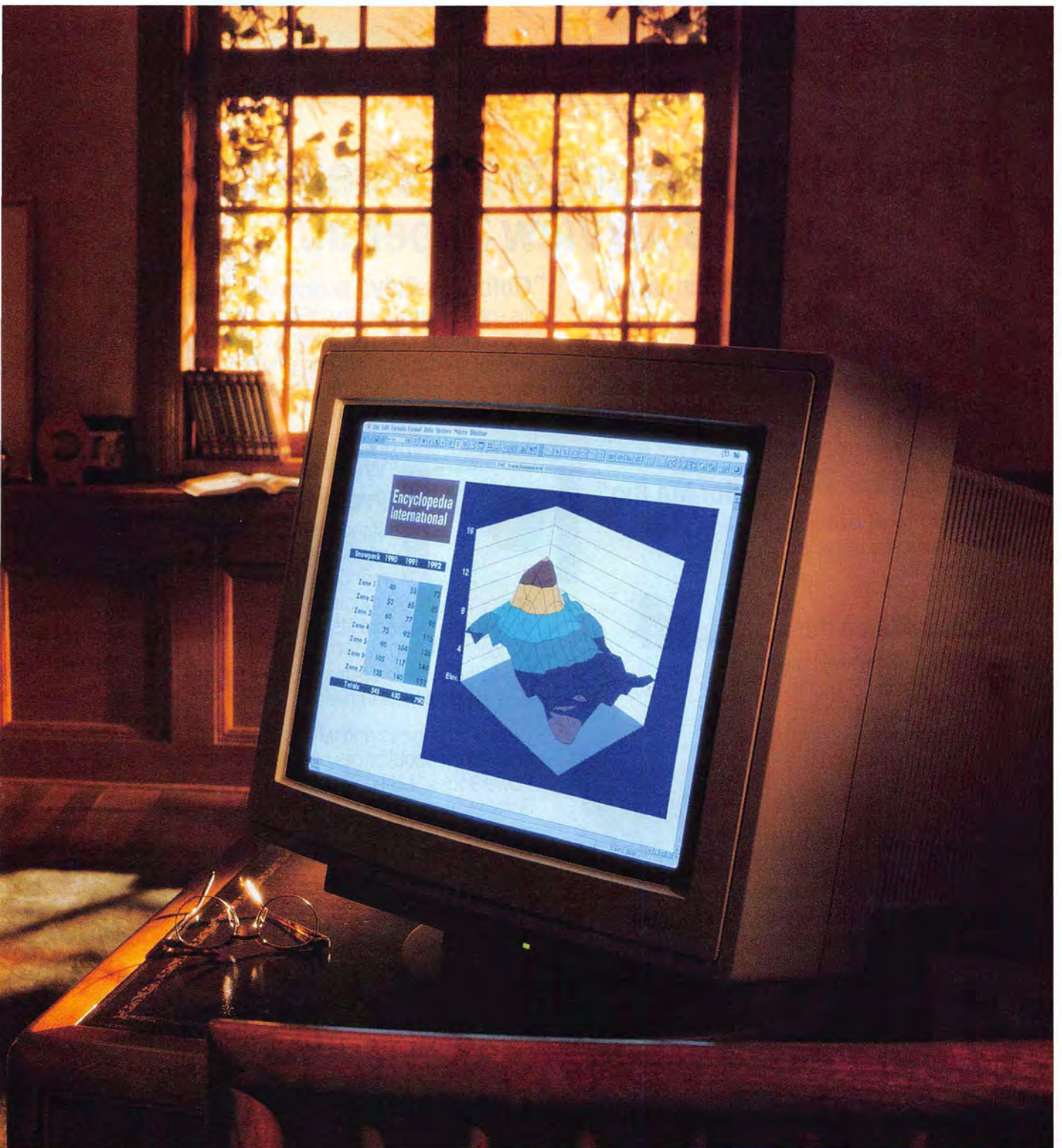
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Organizing the Olympics

The Associated Press used FreeHand to produce complex yet eye-catching Olympic graphics.

By Janet Ashford

The Associated Press' Graphics Net service produces infographics, charts, and maps for more than 1,000 newspapers. After years of using MacDraw II, the AP recently switched to FreeHand 3.1, because of increasing demand for color graphics and PostScript output. One reason the news service chose FreeHand rather than Illustrator is that FreeHand can export files in PICT format, which can be opened and edited in MacDraw II, easing the transition for member newspapers.

The first major project using the new software was a series of infographics for the 1992 Winter Olympics. Working under art director Karl Gude, news artists Cynthia Greer, Jeff Magness, and Ross Toro spent four weeks creating 22 complex color graphics, each packed with information on Olympic sports terminology, techniques, and history.

After a break to produce graphics for other stories, such as the presidential election, the team began developing a new set of colorful infographics for the Summer Olympics. They appeared in many newspapers during the Summer Olympics, July 25 through August 9.

Graphic designer Janet Ashford coauthored *The Verbum Book of PostScript Illustration*.



The Associated Press created 22 images about the 1992 Winter Olympics, including this half-page graphic on the bobsled and luge competitions. An underlying grid, unified color palette, and simple typography help organize more than 50 type and graphic elements into a complex yet readable infographic.

1 The Background Grid



Each Olympic infographic has an underlying grid to help unify and organize the many elements. For the bobsled/luge graphic, Greer creates a grid of blue, gray, and yellow squares by drawing large rectangles, filling them with color, and overlaying a grid of white .5-point lines. The gray and yellow rectangles have solid fills, and the blue rectangles contain graduated fills. The grid lines are grouped into two- and three-square units, so they can be easily copied and pasted over backgrounds of varying sizes.

2 Adding Graphic Elements



Illustrations, diagrams, and maps are created as separate FreeHand documents and then pasted into the composite image. The strict horizontal and vertical orientation of the grid contrasts with the strong diagonals of some of the illustrations, heightening the sense of drama and movement. All the graphic elements, including the background grid, are kept together in a single layer. Text is stored in a separate layer to make editing easier.

3 Organizing the Text


1992 Winter Olympics

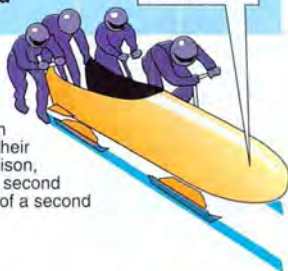


BOBSLED

At speeds approaching 90 mph, two-man and four-man sleds race down an icy, curved track. Fastest combined time of four runs wins.

THE START

 **Watch for** an explosive start. Standing 50 meters behind the starting line, the driver and his brakeman (and two pushers in the four-man) rock their bodies and the sled back and forth in unison, then throw the sled forward. A tenth of a second saved pushing can translate into a third of a second off the run time.



Some sleds are more bullet-shaped this year, without flat tops.

The infographics contain three types of text — headlines with decks, subheads with text, and captions — and just two typefaces, Times and Helvetica. Headlines and subheads are set in Times Bold, which is condensed by applying a horizontal scale of 64 percent. The captions are enclosed in boxes that have arrows pointing to the item being explained. To create the arrows, Greer uses the corner tool to add three points to one side of the box and then pulls out the center point.

4 Special Icons



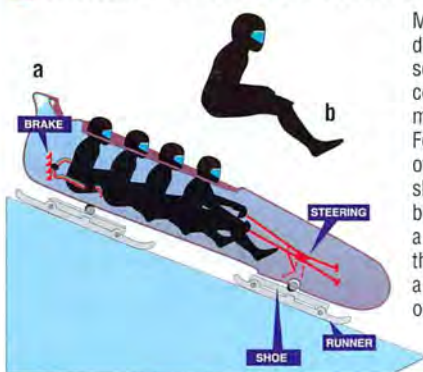
Three distinctive icons highlight certain sections of the infographics. An eye is placed next to "Watch for" text, which describes a feature of the Olympic event that warrants special attention. An eight-pointed red star containing the word *New!* flags text that describes changes in an event, such as new rules. Both the eye and the star are drawn on-screen with the pen tool. A white snowflake on a colored background highlights scheduling information. To create the snowflake, Greer groups three circles at the ends of three thick lines, copies and rotates the unit in 60-degree increments, and positions the rotated elements at the six points of a hexagon.

5 Sports Symbols

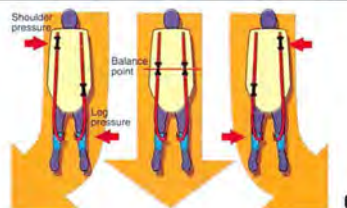


Each sport has its own black-and-white symbol, which appears to the left of the headline. The symbols were designed on paper by a French design firm as part of the Olympics signage-and-design package. To obtain electronic versions of the symbols, the AP artists scan the printouts at 300 dpi. Each symbol is then auto-traced, edited, and saved in PICT as well as EPS formats. (MacDraw and Canvas are used for the PICT work.) Shown here are the symbols for (from upper left) bobsled, luge, freestyle skiing, ski jumping, Alpine skiing (three symbols), and figure skating.

6 Shortcuts in Schematic Drawings



Most of the smaller drawings are simple schematic diagrams, to contrast with the larger, more realistic illustrations. For example, the diagram of the bobsled crew and sled features four simple black figures placed inside a cross-section outline of the sled (a). Each figure is a clone of the same original (b).



A three-part diagram called "Guiding the Luge" shows the underside of the rider and the luge (c). The same figure is used for each part, but the black symbols on the blades are moved to different positions. The figures are placed on orange arrows, which indicate the steering direction. The two outside arrows are clones, one of which has been flipped across the vertical axis.

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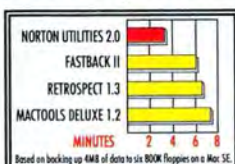
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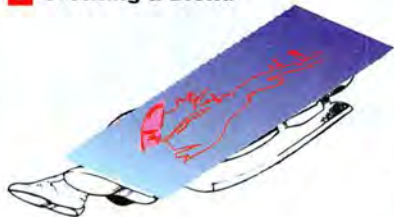


7 Making a Textured Drawing



Toro's drawing of a rider on a luge is based on a pencil sketch. The sketch is scanned at 300 dpi and auto-traced in Adobe Streamline, with a loose tolerance that minimizes the number of points in the outlines. Streamline faithfully copies the original by filling enclosed shapes with black or white. The auto-tracing is saved in Illustrator 1.1 format so that it can be opened in FreeHand.

8 Creating a Blend



To create a blend for the rider's body, Greer draws two rectangles, assigns a different color to each, and executes a blend between them. Because the front tip of one luge blade is part of the white shape that defines the body, Greer draws a separate shape to fit the blade tip, fills it with solid pink, and positions it over the blend. (The outline of the entire shape to be filled is shown in red.)

9 Merging the Blend and Figure



The blend and the pink shape are selected, cut, and pasted inside the white shape of the rider's body, the line weight for which is set to None. The Paste Inside command turns the rider's body into a mask, hiding the areas of the blend that are outside the shape.

10 Locating Open Areas



If we place a colored background behind the auto-tracing of the luge rider, we can see that some of the "white" areas are simply open and therefore transparent, whereas others are opaque shapes filled with white. The opaque shapes are easily filled with solid colors or blends, using the technique just described.

11 Adding Color to Open Areas



To add color to the open areas, Greer draws shapes to fit, loosely following the existing outlines. She fills each shape with a solid color or a blend and then sends it behind the corresponding black outline. Because the open areas are transparent, the filled shapes can be seen through them, and the black outlines mask the shapes' edges.

12 A Graphic Centerpiece

Each infographic for the Winter Olympics has a similar textured drawing as its centerpiece. Shown here are Toro's illustrations for figure skating and freestyle skiing.



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Clip art for network managers? Uh-huh. Whether you want LAN diagrams, patch-panel layouts, or WAN and telephony schematics, Network World's NetDraw Clip Art for Building Networks can save you some time. It's all in PICT format (personally, I would have preferred EPS, but Network World probably thought net nerds weren't into Illustrator). 800-643-4668 or 508-820-7493. \$99.95.

By Henry Bortman

Macs do DOS: Despite somewhat misleading ads claiming that PowerBooks "can run MS-DOS software," Apple only recently shipped a utility that even lets you mount DOS disks on the Mac's desktop. It's called Macintosh PC Exchange, and it costs \$79. Some people think Apple should have built this capability in to the system when it first introduced the SuperDrive. **My advice:** Buy Dayna's DOS Mounter (\$89.95) or Insignia's AccessPC (\$99.95). They're more powerful and run under both System 6 and System 7; Macintosh PC Exchange runs only under System 7.



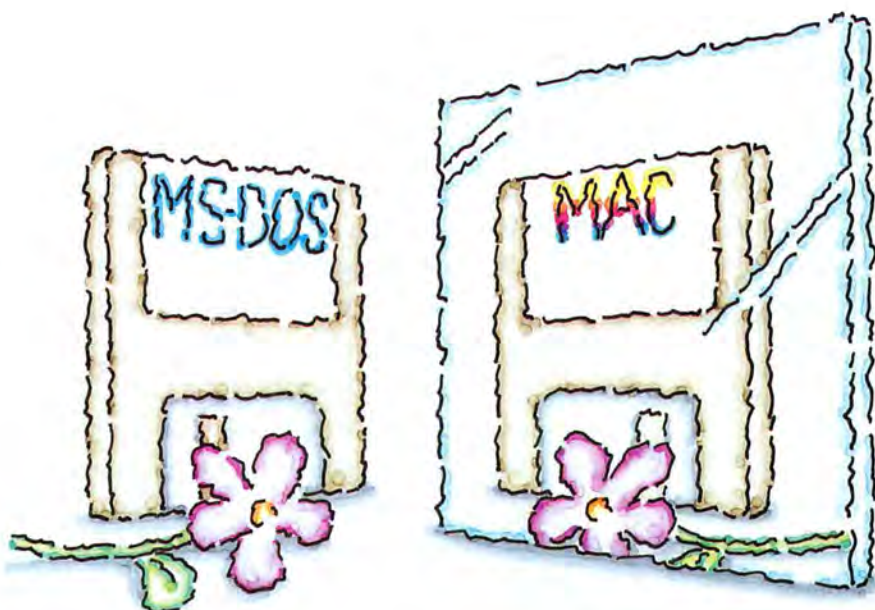
Sharing modems: International Transware offers a couple of three-port serial servers for LocalTalk and EtherTalk networks. Attach as many as three serial devices to IT's SerialWay (modems, serial printers, plotters) and attach the SerialWay to your net, and users on your entire network can access



the serial devices from the Chooser. The SerialWay supports communication speeds as high as 57.6 Kbps. Bundled management software provides some password security and network-hiding capability. 415-903-2300. SerialWay EN, \$999; SerialWay LT, \$599. ♣ Applied Engineering **takes a different approach** to sharing serial devices. It offers a \$149 control panel with which you can share on your network a device connected to one of your Mac's serial ports. You can also check out Applied Engineering's QuadraLink DMA (\$499), which gives your Mac four additional high-speed (57.6 Kbps) serial ports. Buy both products, and save \$50. 214-241-6060.

Year of the rack: Farallon has finally announced its rack-mountable hubs and routers. The Farallon Concentrator (\$2,990) is a 19-inch chassis with 11 slots, into which you can place StarController, StarRouter, and InterRoute/5 modules. The StarController modules are based on the 12-port LocalTalk and Ethernet hubs available today as stand-alone devices. The StarRouter is **a combination device** that contains a LocalTalk-to-Ethernet router, 12 LocalTalk ports (all on a single LocalTalk network), and one Ethernet port. InterRoute/5 is a multiport LocalTalk-to-Ethernet router that routes data among one Ethernet and four LocalTalk networks. Each router product works with TCP/IP networking protocols, the SNMP management protocol, and AppleTalk. Expect a price tag of less than \$3,500 for each. 510-596-9000. ♣ Shiva has also put the FastPath on the rack, with the FastPath 5R. One or two FastPath 5s can fit in a 1.75-inch-high enclosure, which can be mounted in a 19-inch rack. 617-252-6300. Single-unit model, \$2,799; two-unit configuration, \$5,399. ☞





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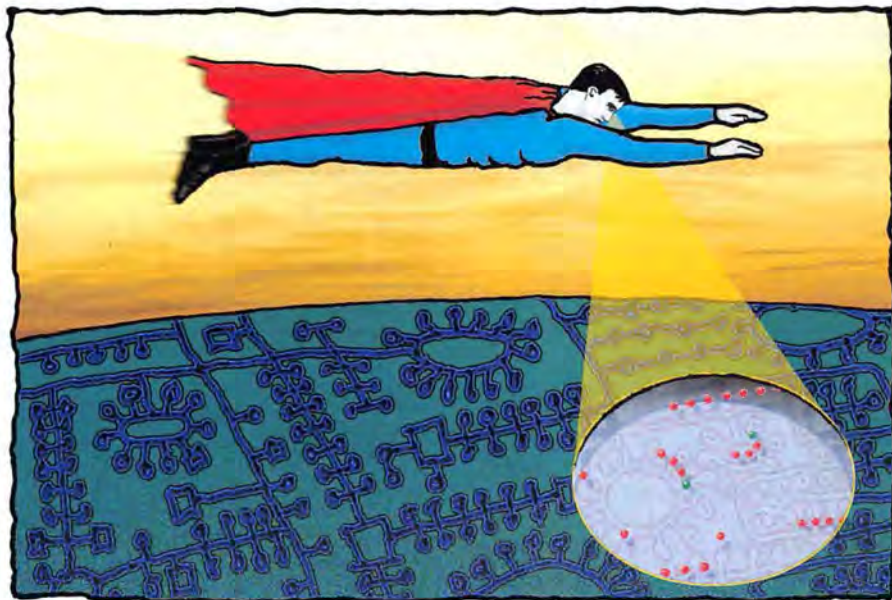
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CIRCLE 153 ON READER SERVICE CARD.

Probing for Problems

Product updates from three major packet-analyzer vendors make it easier for you to probe your network for problems — from near or far.

By John Battelle



When Superman needed to uncover hidden evil doings in Metropolis, he just turned on his X-ray vision. If you lack the built-in superpowers to be SuperNetworkManager, you can always take the Batman approach and keep the right tools handy for tackling whatever problem you might encounter. When it comes to network problems, a pair of network-X-ray specs — that is, a packet analyzer — is a tool no network manager can do without.

Packet analyzers probe your network at the deepest level, collecting and unwrapping data packets to see where the packets came from, where they're headed, what might be wrong with them, and what flavor they are (in other words, what protocol they are: AppleTalk, NetWare, and so on). Packet analyzers present summary statistics on error types, network usage, and protocol types. Because they can pinpoint areas of trouble on your network, packet analyzers can be one of your most powerful tools.

Since we last reviewed their LocalTalk and Ethernet analyzers (see "Tools of the Trade," February '92, page 233), the three major packet-analyzer vendors — AG Group, Distributed Technologies Corp. (DTC), and Neon Software — have released upgrades to their products. In addition to improving the interfaces and playing catch-up with each other on features such as filtering, protocol support, and real-time packet-header display, these vendors have made their products more useful for

network managers who work remotely: All the products now support the PowerBook, and depending on the product you pick, you may also get a remote-data-capture utility or built-in pager support.

LocalTalk Analyzers

LocalTalk analyzers are designed to probe smaller, LocalTalk-only LANs, but don't think these products are small-time — they can give you a wealth of information about the health of your network.

TalkSpy 1.6.1. DTC's TalkSpy is sold as part of TalkManage, a \$695 integrated network-management package. It's also available separately with its companion, TalkStat, DTC's traffic-analysis module, for \$495.

TalkSpy now sports a new control bar intended to simplify its use. The Start, Stop, Clear, and Filter buttons are prominently displayed (see Figure 1). The control bar also has a Display button that lets you open a window and view packet headers one by one as they are collected.

The most notable addition in the current version of TalkSpy is the filtering feature, which helps you focus on certain types of packets to isolate problems. Previous versions had no filtering at all; version 1.6.1 allows you to filter packets based on their protocol: ADSP (AppleTalk Data Stream Protocol), AEP (AppleTalk Echo Protocol), ATP (AppleTalk Transfer Protocol), NBP (Name Binding Protocol), RTMP (Routing Table

BRIDGES NETWORK MANAGEMENT

Maintenance Protocol), and ZIP (Zone Information Protocol). A filter window offers a check box for each of the supported protocols, but you can't save multiple configurations of filters for easy recall, as you can with either LocalPeek or NetMinder LocalTalk.

This version of TalkSpy also lets you choose incremental- or continuous-data-collection mode, using a toggle switch. If you select incremental mode, TalkSpy collects packets at an interval predetermined by the software (you can't set it yourself). If you select continuous mode, TalkSpy makes what the documentation calls a "best effort" to collect all packets on the network (processor speed and available RAM affect your results). A display window shows packet information, but TalkSpy displays only packet-header information, so you can't use it to test the integrity of the data within packets and do extensive error checking, as you can with LocalPeek or NetMinder LocalTalk.

Some of the other new features include PowerBook support, the ability to save and print packet-header information, and the ability to collect and process data in the background.

Although TalkSpy 1.6.1 sports many new features, it has several drawbacks. The documentation is still sparse (the new version gets only a two-page update) and difficult to navigate. The new, prettier interface (see Figure 1) is somewhat confusing: For example, the Display On/Off switch (which performs the same function as a standard close box) is enclosed in the Mode box even though the display choice has nothing to do with the data-collection mode, and the mode switch isn't always in sync with the current mode. DTC also clings to its original copy-protection scheme, which lets you install only two copies of TalkSpy from the floppy onto a hard disk. Finally, TalkSpy cannot run on a Mac IIx.

LocalPeek 1.1.1. AG Group has significantly updated LocalPeek, adding many new features borrowed directly from EtherPeek, AG's Ethernet packet analyzer. The best of these is the Packet Selection feature, which lets you sift through a batch of previously collected packets and select a subset based on various criteria. For example, you can choose to view a subset of just those packets that were headed for a particular LaserWriter or all packets of a particular length.

AG has also added an echo mode to the new version of LocalPeek, allowing the

program to double the load on a network (echo mode creates a double of each packet on the network). This mode is particularly useful for network stress testing.

Also new is LocalPeek's ability to save and load any number of configuration

files (a configuration file includes your program-specific preferences, such as filters, triggers, and alarms). Because LocalPeek lets you save and load as many configuration files as you want, you can create different files for different network



Figure 1: DTC gave TalkSpy a major interface overhaul in version 1.6.1, including a new control bar and packet-header window, but the new interface isn't as intuitive as it looks—for example, the mode switch isn't always in sync with the current mode.

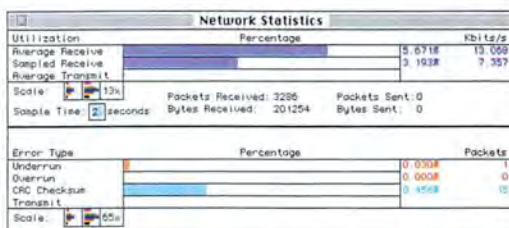


Figure 2: One of LocalPeek's many new features is a Network Statistics window that summarizes activity on the network in real time.

ATP

This is an AppleTalk Transaction Protocol (ATP) packet. ATP is a protocol that provides reliable communications as a series of packet exchanges. Each transaction is identified by a unique transaction identifier (TID) and comprises a request (TReq) for data, followed by one to eight response packets (TResp), and possibly ending with an acknowledgement (TRel) packet from the node that made the original request. ATP is used by several services and applications, including the Printer Access Protocol (PAP) used by LaserWriters and other printers, the AppleTalk Session Protocol (ASP) used by AppleTalk Filing Protocol (AFP) file sharing, and by such network services as QuickMail and TOPS.

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Figure 3: Both NetMinder LocalTalk and NetMinder Ethernet contain a new feature that's a boon for neophyte network managers: By clicking on an Explain button, you can get details about the protocol of the currently selected packet.

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needs (EtherPeek, NetMinder Ethernet, and NetMinder LocalTalk also have this ability).

Like the other upgrades, LocalPeek now supports the PowerBook. As a further bonus for traveling network managers, LocalPeek's internal alarms can send a message to alphanumeric pagers via Ex Machina's Notify! and System 7's Apple events (see the "Notification: The Network That Finds You" sidebar).

Finally, LocalPeek's statistics display has been spruced up with new Utilization and Error Type bar charts (see Figure 2).

NetMinder LocalTalk 1.1. Neon Software has improved on NetMinder LocalTalk's already admirable on-line-help feature by adding a context-sensitive Explain button. When you click on this button, you can get detailed information on each of the protocols the program decodes. Neophyte network managers in particular will appreciate this new feature, which goes beyond simple definitions to include lists of the services and devices that use a particular protocol (see Figure 3).

In this new version, Neon has added support for SNMP (Simple Network Management Protocol), a standard protocol supported by most network-software and -hardware vendors. SNMP looks to be the network-management standard of choice, with Apple supporting it for AppleTalk. Neon has also added support for AURP (AppleTalk Update Routing Protocol) for wide-area networks.

NetCapture, a stripped-down version of NetMinder that network managers can distribute to users on remote networks, is now included with every copy of NetMinder LocalTalk. NetCapture enables users on remote networks to capture data and then return it to the network manager for analysis with NetMinder LocalTalk. This utility is particularly useful for network managers who are responsible for remote networks but aren't able to visit them regularly. (AG offers a utility that is similar to NetCapture for use with LocalPeek and EtherPeek, but it's available only for licensing at large sites and by network vendors.)

In addition to adding PowerBook support, Neon has updated NetMinder's format for printing packet information, increased the memory allocation for its Map LocalTalk feature, and included a new option for exporting packets in decoded format (the format that appears on your screen).

All timing tests performed with a 24-page document using System 7 on a MacClassic, 2.5 MB RAM, and a 40 MB hard disk. Full reformatting performed when necessary. For detailed performance test methodology, please contact T/Maker. The following are trademarks or registered trademarks of their respective companies: T/Maker, WriteNow, T/Maker Company, Microsoft, MS, Microsoft Corp., Mac, Apple, Macintosh, Apple Computer, Inc.

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BRIDGES NETWORK MANAGEMENT

Ethernet Analyzers

With its myriad protocols and support for an almost unlimited number of network devices, Ethernet is far more complex than LocalTalk. You need to have an

industrial-strength analyzer to make sense of this environment, and Neon and AG each provide such a solution.

Both companies see their market as changing: Instead of chasing each other,

both are chasing the likes of the Sniffer, a \$12,000+, hardware-based protocol analyzer from Network General that has a high-performance card that guarantees capture of every single packet. The Sniffer

Notification: The Network That Finds You

Like Batman with his batphone, many network managers know what it's like to get late-night phone calls from citizens in distress. In the network managers' case, the citizen might be an executive who is trying to print a proposal for the next morning, can't find the printer in the Chooser, and hasn't a clue about what's wrong. It might be a bad router, a broadcast storm, anything.

As if such calls weren't enough, three companies have introduced network-management tools that automatically beep your pager when the network acts up. They can also leave E-mail messages detailing what went wrong.

AG Group's NetWatchman (\$295), Dayna's Network Vital Signs (\$449), and Caravelle Networks' NetWORKS

(\$695) are network-monitoring and alarms applications. That means you can leave them running while you do other things, and they'll alert you when certain set conditions occur — for example, when a server disappears or when a printer jams. (Network Vital Signs includes specialized device-monitoring modules, so it can tell you more than just the "up" or "down" status of a device.)

These programs used to alert you with an audible beep and a flashing icon on your screen, but the manufacturers realized that network problems often occur when managers are gone. To handle this situation, all three companies incorporated paging capabilities into their products. (AG incorporated

paging into its packet analyzers as well — see the main story.)

AG and Dayna use System 7's Apple Events to link their products to Ex Machina's Notify! paging software (\$149 for a single-user version, \$249 for a network version). Caravelle's product comes with its own internal paging software, which has extensive scripting and scheduling capabilities. For example, you can tell it when you'll be on vacation and have it notify someone else about problems that occur while you're gone. (These extra capabilities, along with its ability to monitor TCP/IP as well as AppleTalk network segments, account for NetWORKS' higher price.)

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is powerful, but if you don't have 140 protocols and don't need such features as fiber-optic and token-ring packet decoding, the Neon and AG products are a much better deal at a fraction of the cost.

leave you wondering what went wrong. All three products can pinpoint the problem and send a limited amount of text to your pager. "Server's down in marketing zone," it might say, or "unknown AppleTalk log-in finance" — not as garrulous as Chief O'Hara, but more to the point. (NetWORKS can also communicate with numeric pagers, for those who don't have an alphanumeric one.)

Caravelle Networks Corp., 301 Moodie Drive, Suite 306, Nepean, ON K2H 9C4, Canada; 613-596-2802.

Dayna Communications, Inc., 50 S. Main Street, Fifth Floor, Salt Lake City, UT 84144; 801-531-0600.

Ex Machina, Inc., 45 E. 89th Street, Suite 39-A, New York, NY 10128; 800-238-4738 or 212-831-3142.

NetMinder Ethernet 2.1. Perhaps the most significant improvement in NetMinder Ethernet 2.1 is the addition of real-time packet-header display during collection (an important feature included in all the other programs covered in this review). Version 2.1 also sports a redesigned packet window (a great improvement over the multiwindowed interface of previous versions) and new controls over how a particular packet is decoded. Pop-up menus let you choose three levels of decoding: source, destination, and type. You can also now display more than one decoded-Ethernet-packet window at a time.

Roll Call, NetMinder Ethernet's address-to-name utility, has been updated and renamed NetMinder Addresses.

NetMinder Ethernet retains its predecessor's sophisticated mimicking of the seven-layer OSI (Open Systems Interconnection) networking model developed by the ISO (International Standards Organization), as does NetMinder LocalTalk. This feature is a real plus in multiprotocol

sites, because you can view packets using the same framework used for other OSI-compliant networks.

Neon has included an Ethernet version of the NetCapture utility (see NetMinder LocalTalk description) in the new version of NetMinder Ethernet. The company has also included an Ethernet version of its Explain button, which has plenty of explaining to do with all the new protocols the latest version can decode: AFP (AppleTalk Filing Protocol), AURP, Banyan VINES, SNMP, RARP (part of the AppleTalk stack), Cayman Systems' Tunneling protocol, and better support for the Internet Protocol and AppleTalk ZIP.

Like NetMinder LocalTalk, NetMinder Ethernet can now print and export packet information, and it offers PowerBook support. Like AG's EtherPeek, NetMinder Ethernet supports numerous new Ethernet cards. Unlike AG, however, Neon does not support a modular architecture for new Ethernet or protocol drivers, so you can't add new drivers without installing a new version of the program.

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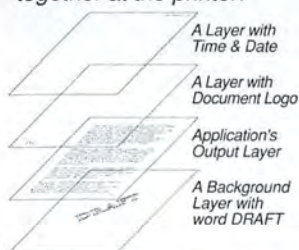
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BRIDGES

NETWORK MANAGEMENT

With its latest version, Neon includes several sample configuration files, templates with preset triggers and filters that automatically configure NetMinder to ferret out particular network problems such as broadcast storms.

Despite all these improvements, you still can't create traffic or cut and paste directly from the packet-decode window. We'd like to see these features included in future versions of both Neon products.

EtherPeek 1.5. This version of EtherPeek doesn't differ much from the version we reviewed in February, but AG has added much-needed support for the Macintosh LC, Quadras, and IIsi, as well as the PowerBooks. And, like LocalPeek, EtherPeek is now able to support

messaging to alphanumeric pagers.

In addition, the company has added support for numerous Ethernet cards, including new cards from Apple, Dayna, Farallon, and Asanté, among others. (Programs such as EtherPeek and NetMinder Ethernet essentially take over your local Ethernet card when collecting packets—they require drivers for every Ethernet card over which they might run.) Unfortunately, neither AG nor Neon added a driver for the Kinetics/Excelan card we wanted to use for our testing, forcing us to change our plans.

The latest version of EtherPeek also supports three new protocols: Apple's AURP, Banyan's VINES, and DEC's LAT (Local Area Transport).

Table 1: Features of Protocol Analyzers


	LOCAL TALK		
	LocalPeek 1.11 ★★★★	NetMinder LocalTalk 1.1 ★★★★	TalkSpy 1.61 ★★★
List price	\$495	\$395	\$495
Pros	Creates traffic. Modular architecture. Built-in pager support.	OSI-like filtering. Good on-line help. Remote-capture utility.	Part of integrated package.
Cons	Relatively expensive. Remote-capture utility costs extra.	Can't create traffic. No cut-and-paste. No built-in pager support.	Can't create traffic. Poor manual and interface. Header decode only. No remote capture. No built-in pager support.
Filters	offset, address, DDP, protocol	offset, address, DDP, protocol, OSI	protocol
Triggers	time, offset, address, protocol	time, offset, traffic, filters	none
Alarms	node, protocol, threshold, trigger	threshold	none
Protocols	AppleTalk, including SNMP, AURP, and MacIP	AppleTalk, including SNMP, AURP, and MacIP	AppleTalk (headers only)
Creates traffic	yes	no	no
Pager support	yes	no	no
Company	AG Group 2540 Camino Diablo Walnut Creek, CA 94596 510-937-7900	Neon Software 1009 Oak Hill Rd. Ste. 203 Lafayette, CA 94549 510-283-9771	Distributed Technologies Corp. 275 Wyman St. Waltham, MA 02154 617-684-0060

*Protocols on EtherTalk are too numerous to list here.

AG's unique modular architecture separates protocol and Ethernet interfaces from the main application. New drivers are delivered as separate files that you copy directly into the appropriate interface folder, making EtherPeek simple to update.

The Bottom Line

Although greatly improved, TalkSpy can't be considered in the same class as its more sophisticated competition. AG's and Neon's products are simply more powerful and easy to use. For those who don't need to create traffic or cut and paste packet information, Neon's pricing structure make its products a better buy (see Table 1) — and the new Explain

button and remote-capture utility are a boon to understanding and managing a far-flung network. For a wealth of features that include built-in pager support as well as traffic-creation and cut-and-paste capabilities, you can go with AG and get the added convenience of easy-to-update modular architecture. Updated interfaces, new feature sets, and support for even more protocols make both packet-probers worthy contenders for your network-management dollar. And unlike Superman's X-ray vision, they're not affected by kryptonite. 

John Battelle travels almost as much as Superman but still manages to write frequently on networking topics.

ETHERNET

EtherPeek	NetMinder
1.5	Ethernet 2.1
\$795	\$495
Creates traffic. Modular architecture. Built-in pager support.	OSI-like filtering. Good on-line help. Remote-capture utility.
Relatively expensive. Remote-capture utility costs extra.	Can't create traffic. No cut-and-paste. No built-in pager support.
offset, address, DDP, protocol, hex/ASCII, error, size	offset, address, DDP, protocol, OSI
time, offset, address, protocol	time, offset, traffic, filters
node, protocol, threshold, trigger	threshold
11 EtherTalk*	13 EtherTalk*
yes	no
yes	no
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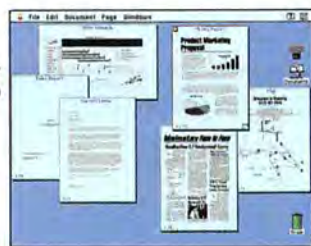
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CIRCLE 76 ON READER SERVICE CARD.



PERSONAL MACINTOSH

How desperate are PowerBook owners for accessories? Well, there's always the Knee Pad, a \$49.95 contraption from Flat Folding Technologies (800-728-0302 or 515-581-4114) that you can attach with Velcro to your thigh so your laptop won't have to sit in your lap. The company's brochure shows a businessman wearing one while sitting astride a Harley. No, *he* isn't driving; the woman in the spiked heels and leather miniskirt is.

By James Bradbury

Choose the write mentor: If you want to write with your Mac, you buy a word processor. If you want to write *creatively*, you still need a word processor, but other software assistance is available. If you suspect that a novel or screenplay might be lurking somewhere in your CPU, you can get a **writing teacher in a box** with the Stein Creative Writing Program's WritePro or with Storyline from Truby's Writers Studio. The former is a \$149.95 creative-writing tutorial that interactively teaches you the same tricks of the trade that writing instructor Sol Stein uses to instruct best-selling authors. 800-755-1124 or 914-762-1255. ♦ The \$345 Storyline, designed specifically to help you structure and write a screenplay, is based on the accumulated wisdom of script doctor John Truby. 310-575-3050.

Red menace: The latest from the world of input-device accessories is the little red Corvette Mouse, a \$19.95 plastic shell from Suntime that slips over your mouse and turns it into what looks like a Mazda RX-7. You can click by pressing on the hood, but be forewarned: This Corvette is **no ergonomic Volvo**. Use it for long, and you might end up driving through the carpal tunnel. 813-886-1145.



From Corvettes to Volkswagens: Kensington's Turbo Mouse is the VW Beetle of input devices. The company hasn't changed the basic design since it was introduced more than five years ago. Now, with the Turbo Mouse 4.0, Kensington's taken the radical step of moving the ADB ports from the sides of the trackball to the rear. At the same time, it's gotten rid of the dopey DIP switches for configuring buttons and unveiled some amazingly slick control-panel software. Neatest innovation: something called Brilliant Cursor, which **teleports your cursor** to preset screen locations. 800-535-4242 or 415-572-2700. \$169.95.



Read-only classics: If you'd rather read books on your Mac than write them, Voyager's recent agreement with Random House to publish classic titles from the Modern Library series as Expanded Books is welcome news. *The Picture of Dorian Gray* is the first fruit of the collaboration. Titles will be priced between \$19.95 and \$24.95. 310-451-1383. ♦ Readers who are still **too young for Oscar Wilde** are also in luck: Discis Books is rereleasing its series of titles at prices between \$39.95 and \$54.95. These won a *MacUser* Editor's Choice award in 1991, when they cost almost twice as much. 800-567-4321 or 416-250-6537. 🐭



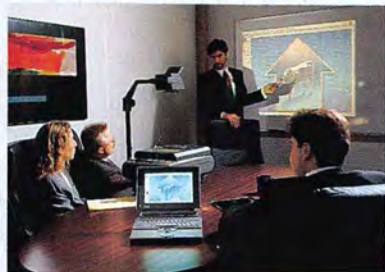
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You've got to love the PowerBook. Its innovations can take your work to the cutting edge. But with Envisio's NoteBook Display Adaptors, you can go further still. Now you've got the power to drive a range of external monitors and projectors. Suddenly, you've got a powerful desktop computer. A persuasive presentation tool. Connect to a full or two-page display, and you can view one or two 8.5" x 11" pages at once. And by connecting to an LCD overhead or RGB projector, you can share your work with an audience. Use NoteBook Display Adaptor 030 and you can view or project 256 brilliant colors on Apple's RGB Display or VGA monitor. And fast? It's the obvious choice for animation and QuickTime. The PowerBook means freedom, so of course Envisio NoteBook Display Adaptors reside inside the unit. No external hardware, no hassle.

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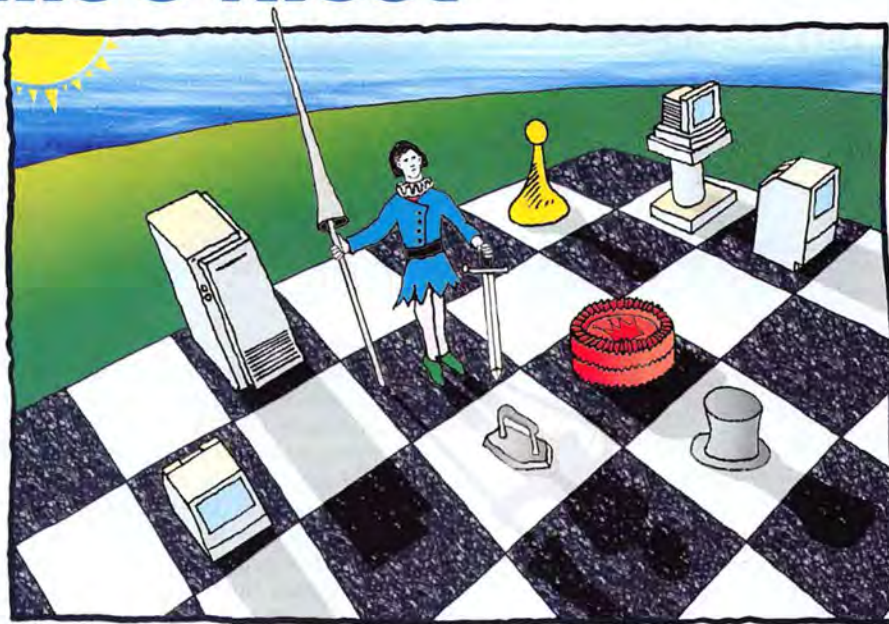
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CIRCLE 70 ON READER SERVICE CARD.

The Game's Afoot

*All work and no play
makes for a dull
computer. Here are
the games that prove
that the Mac can play
with the best of them.*

By Steven Bobker



The Mac is not a Sega or a Super Nintendo, but as a game machine, it beats the pants off PCs. The reason is simple, and it's as valid today as it was in 1984, when all Macs had small black-and-white screens. Games are the ultimate expression of the graphical user interface. In the best games, you're part of the action, part of the screen. It's not by chance that flight and car-racing simulations have always been among the most popular computer games.

I'm going to tell you about some great games for the Mac — but first a little background on some important issues in the Mac game industry.

Makin' Copies

Copy protection has vanished from most segments of the Mac software market. That's good news. Copy protection penalizes the innocent and, at most, inconveniences the larcenous. Games, unhappily, remain one of the last refuges of copy protection. Vendors offer all the standard reasons: history, ease of piracy, young users (does youth equate to dishonesty?), and so on. The reasons are as absurd now as they ever were. Yes, software piracy exists, but copy protection doesn't do much to stop it. It does cut down on sales, though, and thus probably reduces the gross number of pirated copies.

Many game publishers have resorted to something they call nondisk copy protection. That's simply program code that demands

some snippet of information you can find in the manual or other documentation before it lets you proceed. This system isn't dangerous like "hard," or on-disk, protection, which often fouls up backups and can physically destroy data elsewhere on your disk if it goes amiss. But it's still copy protection. Can you imagine carrying a stack of manuals or code wheels around in case you decide you want to play your favorite game? I can't either. Occasionally I'm stupid enough to buy a game with this sort of protection. I figure that this time I'll keep track of the manual. Hah.

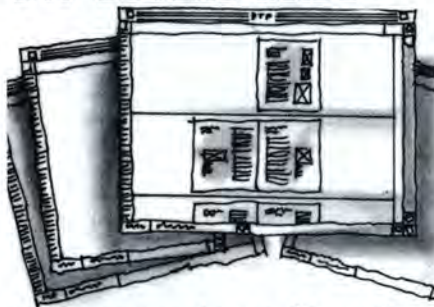
Hellcats over the Pacific, an excellent flight-simulator game from Graphic Simulations, uses this sort of protection, but it sends you an unlocking code when you register. That's marginally acceptable.

Don't expect great publisher support for games either. Because games are inexpensive, support is a luxury, and you should appreciate any you can find. Probably the best place to get game support is from online services, where users as well as company representatives congregate. The best two places are America Online, where you'll find company-sponsored bulletin boards, and the MacFun forum of MAUG on CompuServe, which is the ultimate answer source.

Users of Apple's inexpensive 12-inch RGB monitor have their own special problem. Far too many game designers assume that the smallest possible Mac color screen is that of

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MAC-TO-PC CONNECTIVITY

is the subject of a new Bridges section being launched in our November issue. Don't miss out!

**NOVEMBER AD CLOSE:
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PERSONAL MACINTOSH PERSONAL BEST

the 640-x-480-pixel 13-inch AppleColor High-Resolution RGB Monitor. The 12-inch version is 512 x 342 pixels. If the game uses fixed 640-x-480-pixel screens, it is unplayable on the 12-inchers (yes, you can use Berkeley Systems' Stepping Out virtual-screen utility, but it's a painful solution and doesn't work with arcade-style games). Far too many games have this failing. If you have a 12-inch monitor, be sure the games you buy work with it. Some that do are InLine Design's Mutant Beach and Tesserae, Microsoft's Flight Simulator 4.0, and Activision's Shanghai II: Dragon's Eye.

Great Games

What are the best Mac games? Hard question to answer. Fashion in games changes almost as fast as hemlines or the color of a power tie. What's in this month may well be passé by Christmas. Arcade-game players have different preferences than strategy-game players do. To merely list the best games in each category would require more space than I have here.

For starters, though, here's a list of enduring classics and some personal favorites. Shanghai II: Dragon's Eye, from Activision, is the sequel to the still-great Shanghai. It's one of the best, most addictive products ever, and it belies the adage that a sequel can never be as good as the original. Also showing great staying power is the Tetris series (Tetris and WordTris) from Spectrum HoloByte. By the time you read this, SuperTetris for the Mac may be out. If the DOS version is any indication, it's going to uphold the Tetris tradition.

On the noncommercial side, one game stands out for playability and longevity. It's Klondike, by Mike Casteel. Originally issued as a commercial product in 1984, it thrives today as a \$10 shareware package (KLONDI.SIT in Library 1 of the ZiffNet/Mac Download Forum). Klondike is the most addictive game I've ever played, and it makes the similar solitaire game Windows is famous for look lame by comparison.

Given my age and slowing reflexes, I prefer strategy games to speed games these days. My current favorites include Micro Bridge Companion, from Great Game Products (800-426-3748 or 301-365-3297), a decent if not inspired opponent and far better than Artworx's Bridge 6.0. InLine Design's Tesserae will also challenge you for hours if not days or

weeks. Casady & Greene is a great game publisher, but even winners such as Mission Thunderbolt, which is basically an old-style adventure/role-playing game with a graphical front end, fail to top its classic Crystal Quest. Yeah, I know, it's an arcade game, but it still draws me in. SimCity is still the best of the Maxis simulation games. Even if it's not the wonder education tool that all the newsweeklies made it out to be, it's still a great game. (Special SimCity tip: Try FUND as a tax rate.)

Microsoft's Flight Simulator usually tops the game best-seller lists, but better flight simulators are out there. Try Bulls-eye's Fokker Triplane for an easy-to-fly plane. And for something completely different, give Wesson International's Tracon II a shot (800-634-9808 or 512-328-0100). It'll likely change all your ideas about commercial flight and air-traffic control. If you have Microsoft's program, check out the extra scenery packages that are available from Mallard Software (214-436-0044).

In the realm of educational games, you'll find the Carmen Sandiego series, from Brøderbund. These games teach geography, history, and other subjects, albeit in small doses. The MECC series (Word Munchers, Number Munchers, and Super Munchers) is fun and instructive. MECC's Oregon Trail and its groupware version, Wagon Train 1848, make fine introductions to a fascinating period of U.S. history.

The game market is still wide open, and great games are appearing faster than ever, as developers realize how quickly the market is growing. I'd like to make a request: Please, someone, publish a great backgammon game. Backgammon is eminently computer-playable. Indeed, a computer playing against all the best human players won the world championship a few years ago. I recently broke one of my own rules and bought a disk-protected backgammon program. The package promised quite a bit of playability that I hoped would offset the protection. Alas, the protection and my system environment clashed bitterly, and I never did find out if the game was any good.

Road Tips

When hard-disk space is at a premium, you can turn to products such as AutoDoubler, More Disk Space, and SpaceSaver (the latter was still in beta at press time) for dramatic savings and some

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PERSONAL BEST

performance degradation and risk. However good these programs are, though — and the jury is still out on at least MDS and SpaceSaver — the safest way to get more space is to buy a larger hard drive. As I'm writing this, 80-megabyte drives are the largest PowerBook-sized hard-drive units, but 120-megabyte units may be available by the time you read this.

You'll get the most-efficient space use and best performance from your big (80-megabytes-plus) PowerBook hard drive by partitioning the disk. The reason is simple. All hard disks have a standard block size, the smallest division of a hard disk that data can use. If the block size (sometimes called the allocation block size or the clump size) is 2K, which is typical of 64- to 80-megabyte hard drives, a 10-character message will use the same 2K physical block size that a 1,900-character message does.

Your goal is to work with the smallest reasonable allocation block size. For all practical purposes, these sizes are fixed and depend on the total size of the partition. Here are the numbers:

- Up-to-32-megabyte partition, 512 bytes.
- 32 to 64 megabytes, 1K.
- 64 to 98 megabytes, 1.5K.
- 98 to 130 megabytes, 2K — and so on.

If you typically create lots of small files, using partitioning to reduce the allocation block size can save space. It can also improve performance by reducing the amount of index and positioning data that the system must wade through while working. The performance gain will probably be too small to see, less than 15 percent, but it will be there.

Two free tools are available that make using your PowerBook easier. Although not written specifically for PowerBooks, MICN turns your menu titles into icons, leaving more room for battery indicators, modem-status bars, and the many icons at the right end of your menu bar. MICN 1.3 is freeware by M. Valence. Its ZiffNet/Mac filename is MICN.CPT, and you'll find it in Library 3 of the Download & Support Forum.

Also wonderful is ExtendIt!, which converts Command-Shift-5, -6, -7, and -8 to Home, End, Page Up, and Page Down, respectively. This long-needed free tool is by Andreas Atkins; its ZiffNet/Mac filename is EXTEND.CPT. You can find it in Library 3 of the Download & Support Forum.

The Eggs of Summer

The original Macintoshes had signatures of the original development team engraved inside the cases. Eventually Apple dropped the names, but the idea has resurfaced with the release of a few later machines.


Beginning with the SE, some Macs have contained development-team pictures buried within the ROM. Here's how to get to several of them.

To see the pictures on the SE, you must have the programmer's switch installed. That's the small plastic thing that sits on the left side of the computer near the lower back corner. Without it, you're out of luck, at least as far as this egg is concerned. Press the interrupt switch, the rearmost button. This gets you into the machine-level debugger (the plain white window that overlays everything else on your screen) and gives you a > prompt. Type the following sequence: G 41D89A (the space between the G and the 4 is essential). Then press Return.

You'll be rewarded with three bit-mapped scans of the SE's development team. To get back to real work, you need to reboot your Mac by pressing the reset switch, the frontmost part of the programmer's switch. You can also simply turn the main power switch off and then back on.

To see the IIfx's goodies, bring up the General Controls control panel and set the date to September 20, 1989, which was the IIfx's release date. Then reboot the computer while holding down Command-Option-C-I.

To see the IIfx's treats, follow the same procedure as you did for the IIfx but set the date to March 19, 1990. The four keys to hold down are Command-Option-F-X.

The Classic's special treat is the simplest to see: Just hold down Command-Option-O-X as you start up the computer. Wait a while, and the Mac will create a RAM disk that holds System 6.03 and Finder 6.1x. If you have a utility, such as ResEdit or MacTools, that lets you see invisible folders, you'll see one in the RAM disk's System Folder. Inside is a list of people who worked on the Classic. 

Steven Bobker, a former editor-in-chief of *MacUser*, currently keeps busy acting as system operator (sysop) for *MacUser*'s on-line service, ZiffNet/Mac, among other projects. He can be reached at 72511,45 there and welcomes all comments.

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How to Buy a Laser Printer

Buying a laser printer is a little like buying a car. Will the sturdy economy printer really be enough, or do you need the zippy little sports model that spits out page proofs in no time flat but puts a big dent in your budget? And what about such extras as fonts, memory, and special paper trays? To start making your buying decision, see "Getting Down to Business: Workgroup Printers," September '91, page 128; then try the following tips.

By Victoria von Biel



✓ There are two types of laser printers: PostScript and QuickDraw. PostScript printers can be used on a network, and they let you print outline fonts and graphics created with Adobe's PostScript page-description language. QuickDraw printers, such as the Apple LaserWriter LS, can not be used on a network or to print PostScript documents.

💰 Do you really need a PostScript printer? If simple text files or spreadsheets are all you print, the answer is definitely no. You can print graphics on a QuickDraw printer, but you need PostScript to print graphics that were created with a PostScript application, such as Illustrator or PageMaker.

💰 Consider inkjet printers, which have resolutions comparable to those of QuickDraw laser printers but cost about half as much. And some inkjet printers can be used on a network.

💰 If you do want PostScript, you can save as much as \$400 by buying a printer that uses cloned PostScript technology instead of the real thing licensed from Adobe. Printing very complex graphics requires true PostScript, however.

❓ Before you buy, make a comprehensive list of which

applications you use, what you print, and what page sizes you need. Then create test documents that typify what you print. Include PostScript graphics, rotated and filled text, and any unusual fonts you use regularly. If you're buying from a dealer, use the sample files to see how the printer copes with them. If you're buying by mail, call the printer manufacturers and see if you can arrange a demonstration in your office.

✓ Buying a secondhand printer? You can find out how many pages it has printed by checking the startup sheet it prints out when you turn it on.

✓ Beware of manufacturers' speed claims. Most printer ads cite a page-per-minute speed, which doesn't take the document-imaging time into account. For documents with elaborate graphics, that can be a long, long time.

✓ If you need an especially fast printer, be sure to purchase one with a RISC (reduced-instruction-set computing) processor.

💰 Find out what the printer's consumables cost. Also find out what other components need to be regularly replaced.

❓ Even if you don't need special paper trays now, make sure they're available if you want to add them later.

❓ Plugging a ROM card into a PostScript printer is a new way to add fonts and provides quick access to several fonts for less than \$300 per card. A card's main advantage is speed, in that you don't have to download the fonts each time you want to use them.

✓ If you use several fonts regularly, buy a printer that can be connected to a hard-disk drive in which you store the fonts.

❓ Ask how much memory the printer has and whether you can upgrade it. Low memory configurations (less than 2 megabytes) may affect what page sizes you can print (important if you print legal-sized documents) and how many fonts you can use.

💰 Don't buy memory upgrades directly from a dealer or manufacturer. Check out third-party companies for the best prices.

❓ Make sure the printer you choose is compatible with your network. Tell the dealer what platforms and network configuration you'll be using with the printer. Ask what cabling and connectors are required. If possible, try the printer on your network to see how it performs.

❓ If you're considering a printer that is not designed exclusively for Macs, make sure the price includes an AppleTalk interface kit. 🖨️

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By Victoria von Biel

Quick video: Try your hand at digital video with the QuickTime Starter Kit. Apple has packaged the QuickTime extension with a CD-ROM containing more than **400 megabytes of video, animation, and still images** and four utilities: MoviePlayer, which plays QuickTime movies; Picture Compressor, which provides JPEG compression for still images; Movie Converter, which converts existing material into Movie format; and Movie Recorder, which lets you directly access video-digitizing cards. 800-776-2333 or 408-996-1010. \$169.



Rules of attraction: At first glance, Magnet, from No Hands Software, simply looks like a run-of-the-mill file-management utility; look a little closer, and you'll find a utility that uses agents to **automate your humdrum tasks** — from putting away files to updating versions of documents you have on your office Mac and on your PowerBook. You can set magnets to run at preset times or when certain conditions (shutdown or volume mounting, for example) exist, and because magnets run in the background, you can keep working on important stuff while your Mac gets on with the dirty work. 415-321-7340.



Answers by phone: Got questions about Microsoft's most popular products? The folks in Redmond have set up recorded "fast tips" messages for Word (206-635-7200), Excel (206-635-7080), and Mail (206-637-9307), among others. If that doesn't help, you can talk to a real, live support person. And if you *do* end up on hold, at least Microsoft can afford **a live DJ to play tasteful music** and provide up-to-the-minute reports on phone-wait times.

Fast and free: Adding a logo or letterhead to a document not only inflates the file's size but also turns printing into a long, drawn-out experience. LaserMerge, from MindGate Technologies, **slims files and trims printing time** by pulling static text or graphics out of documents and into templates that are downloaded to your printer and merged with your documents at printing time. Each template can hold as many as 63 rearrangeable, rotatable, and clippable elements. LaserMerge works with QuickDraw and PostScript printers, although only PostScript printers let you use its forms-generation mode. 800-648-6840 or 615-937-8004. \$95. ■ For those who store such documents on SyQuest cartridges, SyQuest/SCSI Probe 3.4 lets you easily mount the correct driver. You can get it for free from SyQuest (800-245-2278 or 510-226-4000) or download it from America Online, GENie, or SyQuest's own BBS (510-656-0473). ■



Peak Performance

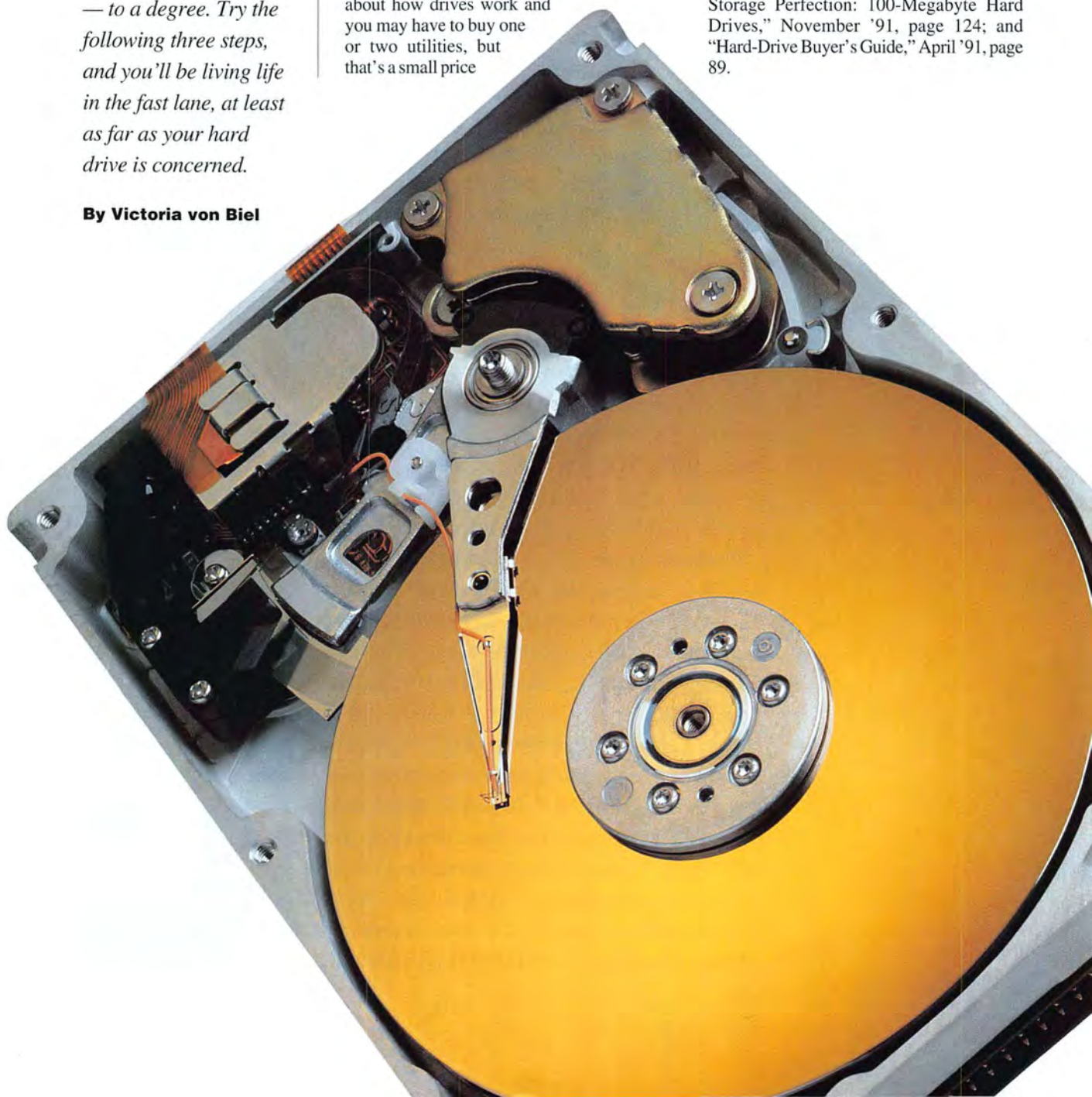
Two things in life we all want are unlimited riches and a fast hard-disk drive. The first may not be possible; the second is — to a degree. Try the following three steps, and you'll be living life in the fast lane, at least as far as your hard drive is concerned.

By Victoria von Biel

If your Macintosh seems a little sluggish, you've got a couple of options: Go out and buy the fastest CPU and hard-disk drive money can buy, or try to improve the performance of what you've already got. Assuming that your budget doesn't allow for the purchase of a Quadra 950 and a solid-state drive, there are ways to improve your present hard drive's performance. You'll need to know a little bit about how drives work and you may have to buy one or two utilities, but that's a small price

to pay to get your drive up to speed.

If you're interested in finding out more about the performance of hard drives and other storage options, see the following *MacUser* articles: "Storage Buyer's Guide," July '92, page 111; "Sizable Storage: 200-Megabyte Hard Drives," April '92, page 108; "How to Buy Hard-Disk Drives," December '91, page 225; "Searching for Storage Perfection: 100-Megabyte Hard Drives," November '91, page 124; and "Hard-Drive Buyer's Guide," April '91, page 89.



Tidy up

Both you and your hard drive will get bogged down if your disk is chock-full of files and folders you never use. And if your disk is full to capacity, it's more likely that files will be fragmented, meaning that it will take longer to open and save them. If that's the case, it's time to clean house. Start by going through all your files and trashing anything you definitely don't need (temporary files, old preferences files, duplicates). Next, create a folder called Archive and transfer into it any files you want to save but that you don't use

regularly (old reports, letters, and charts, for example). Copy these files onto another medium — floppy disks, tape, removable cartridges — and then delete the files in the Archive folder. Keep the folder on your hard disk, however, so that you can archive files as you're done with them. Back them up and remove them from the hard disk on a regular basis. (Note: This is just a way to move files you don't use off your hard disk. It is *not* a substitute for regularly backing up the contents of your hard disk.)

Defragment

Files become fragmented when the free spaces on the disk aren't big enough to save all of a file's data. As a result, part of the file will be saved in one chunk of free space and the rest will be saved in other chunks of space. That means that the disk's read/write heads have to skip all over to read a file. When you *defragment* a disk, you're rearranging the data clusters so that each file's data is stored in one space on the disk.

If you want to defragment your hard disk yourself, copy the contents of the disk to another hard disk (or tape or removable cartridge); reformat the hard

disk, using the software that came with the drive; and then copy the original data back onto the disk. That's the hard way. The easy way is to buy a utility such as DiskExpress II, from Fifth Generation Systems, or The Norton Utilities for Macintosh (which now includes SUM II), from Symantec. If you've partitioned your disk, defragment the partition containing your working files frequently — about once a month.

Always back up the contents of your hard disk before defragmenting. There's a slight chance that the process can cause you to lose data.

Partition

If you have a large hard-disk drive, say bigger than 100 megabytes, you should *partition* your disk. You can do this with the formatting software that came with your drive or with programs such as SilverLining, from La Cie; Drive7, from Casa Blanca Works; or Hard Disk Toolkit, from FWB. Just make sure the software lets you create real partitions, not "file" partitions. Partitioning your hard disk means you're dividing it

into sections the Mac treats as *volumes*, or separate disks. By partitioning, you create two or more separate disks for storing information. The volume that contains the System Folder will mount as usual when you start up (you can have System Folders on more than one partition; use the Startup Disk control panel to determine which will mount at startup); you can then mount any volume you want to access and dismount it when you're finished with it. There are plenty of advantages to

partitioning a hard disk. As far as performance goes, partitioning limits the area in which the drive has to look for files, so it speeds up access time. And because you're dealing with a smaller space, files don't fragment as much; when they do, it takes less time to defragment a volume than to defragment an entire hard disk.

The main advantage, however, is determined by the partitions' placement on the hard disk. Because disks write from the outside in, the first partition you create resides on the outer edge of the disk, meaning that the heads pass over more data as they circumnavigate the disk. Because anything on this part of the disk is accessed more quickly than files stored on other areas, use this partition to store working files you use frequently as well as disk-intensive applications such as graphics programs. The partition closest to the center of the disk (the partition you create last) should contain those programs and files that are usually held in memory — the System Folder and most applications, for example. In this position, the heads pass over less data with each revolution, so it may take a little longer than usual for these files to open, but because they're then stored in RAM, that shouldn't slow you down too much.

Optional Extras

The following tactics are more elaborate — and more expensive — ways to speed things up.



Buy a faster Mac. Although you may have a superfast hard-disk drive, it can't transfer information to the CPU any faster than your Mac's SCSI bus is capable of transferring it. Not surprisingly, the Quadras have the fastest transfer rate (4.8 megabytes per second) and the Mac Plus has the slowest (300 kilobytes per second). The LC and Classic II each have transfer rates of about 1.4 megabytes per second.



Add a SCSI-2 card. You can buy accelerators that claim to boost the speed of your Mac's SCSI bus (see "SCSI Accelerators," March '90, page 175), but according to MacUser Labs, a better alternative is to add a second, faster SCSI bus that works through your Mac's NuBus or processor-direct slot (see "Supercharging the SCSI Bus: SCSI-2 Cards," July '92, Buyer's Guide page 42). To take advantage of such a card, you need a hard drive capable of a sustained throughput rate of about 2 megabytes per second.



Add a RAM disk. If you have RAM to spare, consider creating a RAM disk. A RAM disk sets aside part of your Mac's random-access memory to store applications and files. The advantage is speed: Because the information is stored in RAM, everything works more quickly. The disadvantage is that RAM disks are volatile: When you shut down, the RAM disk is history. Connectix's Maxima utility lets you create RAM disks; DayStar Digital's RAM PowerCard is a hardware option that can hold as much as 256 megabytes of RAM.

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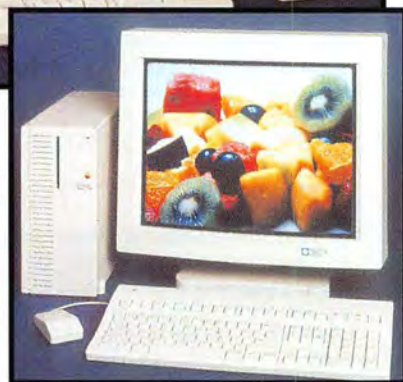
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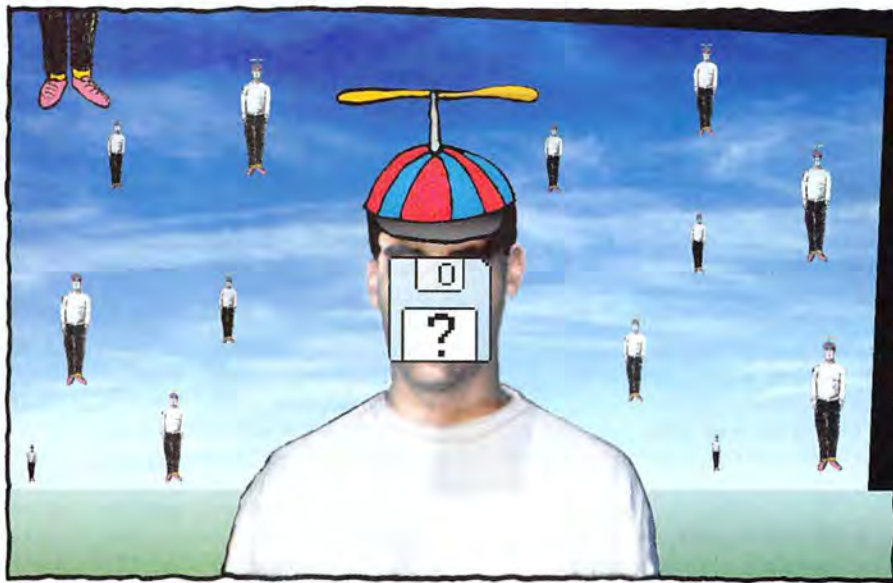
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More Power to You

You've never read a manual, you spend all day gabbing on a BBS, and your Mac plays the "Marseillaise" when you empty the Trash. You're a power user, right? Well, maybe. Take this test to see if you qualify to join the ranks of the enlightened.

By Bob LeVitus



These days the term *power user* is used to describe anyone who knows just enough to choose Shut Down from the Special menu before turning off the Mac. But my definition of *power user* is a little more rigorous. You qualify only if you have a massive working knowledge of the Macintosh and its system software, you read trade magazines (*MacUser* or *MacWEEK*, for example) from cover to cover every month, you know your *Macintosh Reference Manual* backward and forward, you own at least one book about mastering the Mac (*The Macintosh Bible*, *The Apple Macintosh Book*, or my epic *Dr. Macintosh*, second edition), and you never stop lusting after some new piece of hardware or software. And, of course, you've spent a king's ransom supporting your obsession.

But if you're not sure just how powerful a power user you are, take this test. Just answer each question honestly; then add up your points and compare them with the ratings at the end of the quiz. And with any luck, you'll learn something as you go along.

1. The system-software version I use is:

- a. What is system software? (0 points)
- b. 5.x. (1 point)
- c. 6.x. (2 points)
- d. 7.x. (3 points)

Give yourself 1 bonus point if you have the latest version of System 7 Tune-Up installed.

Power users gravitate toward the latest

and greatest of everything: System 7 is no exception. However, there are exceptions to every rule. Here's one: If you have a slower Mac (a Plus or an SE) or less than 4 megabytes of RAM, you'll probably be happier with System 6.x, which runs slightly faster and uses significantly less memory.

On the other hand, if you're really a power user, you've already bought a faster Mac with more memory so you can run System 7. And of course you've installed System 7 Tune-Up (available from dealers, user groups, and on-line services).

2. I read software manuals:

- a. Never. (0 points)
- b. Sometimes. (1 point)
- c. Often. (2 points)
- d. Always. (3 points)

Give yourself 1 bonus point if you own at least one third-party book about the Macintosh or Mac software.

Power users can never learn enough about the Mac and know that they can't master the software without reading the manual.

Although some so-called power users pride themselves on never reading documentation or working through tutorials, they're the ones who are missing out. A real power user reads the manual from cover to cover (no matter how bad it is) and works through all the tutorials (no matter how basic they seem). That's the only way to truly learn a program's features.

BEATING THE SYSTEM

3. I attend Macintosh user-group (MUG) meetings:

- a. What is a user group? (0 points)
- b. Occasionally. (1 point)
- c. Most of the time. (2 points)
- d. Regularly. (3 points)

Give yourself 1 bonus point if you're active in your user group, are an officer, or contribute to its newsletter.

A user group is a bunch of Mac fanatics who hold regular meetings, demonstrate the latest software, exchange shareware and public-domain software, and usually publish an informative newsletter. Power users love their user group and never miss a meeting if they can help it. Those who don't attend meetings can still benefit from the newsletter — it's probably a gold mine of tips and reviews.

To find the user group nearest you, call Apple at 800-538-9696, ext. 500, or call your local Apple dealer.

4. My Apple menu:

- a. Looks like a logo. (0 points)
- b. Looks exactly like it did the day I bought my Mac. (1 point)
- c. Is chock-full of stuff I use a lot. (2 points)
- d. Is so chock-full of stuff that I use a hierarchical utility to help me find things easily. (3 points)

Give yourself 1 bonus point if you put one or more spaces in front of some file or folder names to make them appear at the top of the Apple menu.

Power users get a lot of mileage out of the Apple menu. Utilities such as Now Software's NowMenus, Connectix's HandOff II, Microseeds' HAM, and the shareware utilities BeHierarchic and MenuChoice let you put folders (or aliases of them) into the Apple Menu Items folder and then access their contents directly through hierarchical menus. They're one of the coolest additions to System 7 you can buy.

5. The size of my hard drive is:

- a. I don't have a hard drive yet. (0 points)
- b. 40 megabytes or less. (1 point)
- c. 41 to 80 megabytes. (2 points)
- d. 81 megabytes or more. (3 points)

Give yourself 1 bonus point if you have more than 120 megabytes of storage available and 1 bonus point if your hard disk is partitioned (and you know why you partitioned it).

Power users need gobs of storage. They

know that partitioning a big disk generally improves drive performance, because it tricks your Mac into thinking that one big disk is really several smaller "pseudo-disks" — the partitions. Not only does partitioning improve hard-drive performance but, if you've got a large disk with thousands of files, it also makes finding things a lot easier.

6. I back up:

- a. Only after checking the rearview mirror. (0 points)
- b. Infrequently. (1 point)
- c. Frequently. (2 points)
- d. Religiously. (3 points)

Give yourself 1 bonus point if you back up to a medium other than floppy disks: SyQuest or Bernoulli cartridges, tape, or another hard disk.

Power users know that Murphy's Law is actually Murphy's Law of Computing and that the only foolproof way to protect your work is to back up diligently by copying files onto floppy disks, tape, cartridges, or another hard disk. All it takes is a little time.

I've said it before, and I'll say it again: There are only two kinds of computer users — those who have lost data and those who will. Don't wait until it's too late to begin your backup regimen.

7. ResEdit is:

- a. A dessert topping. (0 points)
- b. Some kind of utility program I've read about but never used. (1 point)
- c. A free utility from Apple for editing resources in Macintosh software. (2 points)
- d. A free utility that lets you customize your software and the greatest thing since sliced bread. (3 points)

Give yourself 1 bonus point if you have a version later than 2.1.

ResEdit is Apple's resource-editing utility, available from on-line services and user groups. It lets you modify most applications and system software, add keyboard command equivalents to menu items, modify dialog boxes, and so on. Be aware that ResEdit can cause irreparable damage and is often less than intuitive, but every power user I know keeps a copy handy and isn't the least bit afraid to use it.

8. When I start up my Mac:

- a. I rarely turn the thing on. (0 points)
- b. I hear a chord and see a dialog box that says "Welcome to Macintosh" and

then the desktop. (1 point)

c. I hear a chord and see a dialog box that says "Welcome to Macintosh," a few icons at the bottom of the screen, and then the desktop. (2 points)

d. I hear a chord, see a custom startup screen, see two or three rows of icons at the bottom of the screen, hear a custom startup sound, and then see the desktop. (3 points)

Give yourself 1 bonus point if you use a custom beep or SoundMaster (shareware) and 1 bonus point if you use a custom desktop pattern or Wallpaper (from Thought I Could software).

Power users love to customize their Macs with extensions, control panels, startup screens, and startup sounds. To keep those extensions and control panels from misbehaving and causing system crashes, most power users depend on an extension manager such as the freeware Extensions Manager, Now Utilities' Startup Manager, or Microseeds' INIT-Picker. These essential utilities let you turn individual extensions and control panels on and off at startup; some of them are even savvy enough to diagnose conflicts.

9. How many SCSI devices can you connect to your Mac?

- a. How dare you talk about my devices that way! (0 points)
- b. One. (1 point)
- c. Six. (2 points)
- d. Seven. (3 points)

Give yourself 1 bonus point if you remember the 512K, 512Ke, and 128K Macs, which didn't even have SCSI ports.

Every Mac since the Plus has been able to accommodate as many as seven attached SCSI devices, one of which is commonly an internal drive. Most Macs let you have as many as six external devices connected at once. Among your choices: CD-ROM, erasable optical, SyQuest, Bernoulli, and tape drives as well as scanners.

10. Shareware is:

- a. A line of clothing marketed by Sonny Bono's ex-wife. (0 points)
- b. Software. (1 point)
- c. Try-before-you-buy software. (2 points)
- d. Try-before-you-buy software that you get from user groups, on-line services, and bulletin-board systems. (3 points)

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Over the past five years I've been associated with over 100,000 people attempting to learn the Macintosh computer. I've watched as each one waged their own personal, private battle trying to master the Mac and the most popular Macintosh programs.

I've felt their frustration, have empathized with their confusion and have understood their computer fears. I've talked to employees who had new computers and new programs dropped on their desk with the directive to "learn this." I've listened to people who struggled night after night trying to read and understand a computer manual. It's amazing how a computer manual can make a fairly bright person feel totally inept.

You'd be surprised at the number of people who have confided in me the fact they've given up trying to learn some of the programs. They've put the box on the shelf and simply written the expenditure off as a bad investment.

Hard Earned Money Wasted

Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? How many programs are each of your people using? Have they really mastered the programs? Do they know the shortcuts and valuable techniques that will save you time, money and increase your professionalism?

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cademy Video Training Library. This library now includes over 80 different titles. Each video is 2 hours long and offers clear, concise, effective training. In some cases you can receive up to 8 hours of training for one program.

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MacDraw Pro Part 1	<input type="checkbox"/>
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MacWrite II Part 1	<input type="checkbox"/>
MacWrite II Part 2	<input type="checkbox"/>
Microsoft Word 5.0 Part 1	<input type="checkbox"/>
Microsoft Word 5.0 Part 2	<input type="checkbox"/>
Microsoft Word 5.0 Part 3	<input type="checkbox"/>
Microsoft Word 5.0 Part 4	<input type="checkbox"/>
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**National Strength
With Personal Understanding**

BEATING THE SYSTEM

sent one or more shareware authors a check this year.

Shareware, as you've probably guessed, is try-before-you-buy software you get from user groups, on-line services, and BBSs. If you use a shareware program regularly, you're honor-bound to send the program's author a check. Some of the best power-user utilities, such as Helium, Screen Flipper, and StuffIt Classic, are distributed as shareware.

11. The minimum memory requirement for System 7 is:

- a. 250 milligrams a day. (0 points)
- b. More than I have. (1 point)
- c. 2 megabytes. (2 points)
- d. 4 megabytes. (3 points)

Give yourself 1 bonus point if you have 8 megabytes or more.

Power users know that to actually use System 7, you need at least 4 megabytes of RAM. Apple used to claim that you could run System 7 on a 2-megabyte Mac, but it's now accepted that you'd have trouble using most applications on a machine with that little RAM. And if you use a power user's assortment of extensions and control panels, you'll need even more than 4 megabytes.

Remember the old saying: "You can never be too rich, too thin, or have too much RAM."

12. RAM speed is measured in:

- a. Miles per hour. (0 points)
- b. Seconds. (1 point)
- c. Milliseconds. (2 points)
- d. Nanoseconds. (3 points)

Give yourself 1 bonus point if you know the speed of the RAM installed in your Mac.

RAM speed is measured in nanoseconds (billionths of a second). Hard-disk-access times are measured in milliseconds (thousandths of a second). Most Macs require RAM that runs at 80 nanoseconds or faster.

Scoring

More than 45 points: You're an Exalted Grand Pooh-bah Power User. Even John Sculley and the two Steves could learn a thing or three from you.


36 to 45 points: You're a Power User Guru. Other power users bow at your feet and beg you for advice.

24 to 35 points: You're a Power User. Congratulations.

12 to 23 points: You're a PIT (Power

User in Training). Close but no cigar. Keep reading, spending, and paying attention, and someday you too may be a Power User.

Less than 12 points: You're a Power User Wannabe. Nothing short of total

dedication (and a little cash) will push you over the brink. Good luck. 

Bob LeVitus is an Exalted Grand Pooh-bah Power User and the author of *Dr. Macintosh and Stupid Mac Tricks*.



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BUT GIVE US A BREAK. THE AD JUST STARTED.



| **SUPER BOOMERANG** | SAVES YOU TIME AND HASSLES BY KEEP-

ING TRACK OF YOUR MOST FREQUENTLY USED FILES AND FOLDERS. THEN IT PRESENTS THEM TO YOU IN THE 'OPEN' AND 'SAVE' DIALOGS OF EVERY APPLICATION. AND IT FINDS LOST FILES WITH EASE—EVEN IF THEY'VE BEEN COMPRESSED.

WILL IT GROUP FONT FAMILIES TOGETHER SO YOU DON'T HAVE TO SCROLL ALL OVER KINGDOM COME TO FIND THEM? YOU BETCHA.

| **STARTUP MANAGER** | CONTROLS THE LOADING OF EXTENSIONS AND CONTROL PANELS. IT HELPS PREVENT CRASHES. IT DISABLES EXTENSIONS THAT DO CRASH. IT EVEN LINKS TOGETHER EXTENSIONS THAT REQUIRE EACH OTHER AND KEEPS DISAGREEABLE EXTENSIONS APART SO THEY WON'T BLOODY EACH OTHERS' PROVERBIAL NOSES.

| **NOW SCRAPBOOK** | ORGANIZES GRAPHICS, TEXT, SOUNDS AND QUICKTIME MOVIES AND STORES THEM IN CATALOGS. IT ALSO SHOWS YOU 'THUMBNAIL' VIEWS AND LETS YOU SORT, ZOOM, SCALE, RESIZE AND CROP IMAGES JUST LIKE A REAL, LIVE ART DIRECTOR. EVEN IF YOU DON'T HAVE A PONYTAIL.

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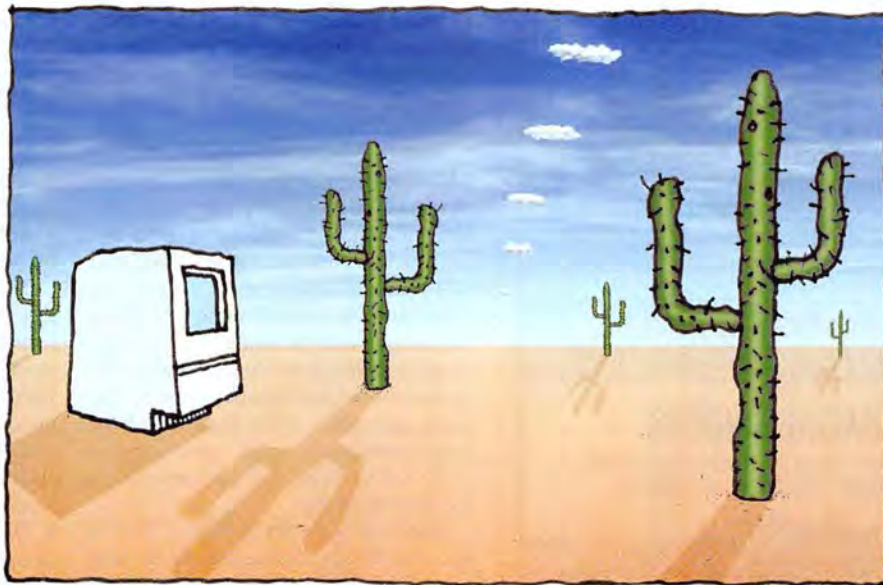


Now
Software

The New Frontier

Still wishing you could use batch files on your Mac? UserLand's new scripting program lets you do that and more.

By Steve Michel



As great as the Mac operating system is, it can't do everything. Users of DOS and other operating systems have a feature called a batch file to help them manage their files on-disk. In DOS, a batch file is a text file containing a series of commands that are executed sequentially when you type the name of the file at the prompt. You can do a lot of nifty things with batch files, such as deleting all the files that have a certain suffix, or extension — .tmp for temporary files or .bak for backup files, for example. Mainly because it has no operating-system prompt, the Mac has never had batch-file capability. The new scripting program UserLand Frontier changes all that. Its language, UserTalk, has a set of commands, called *verbs*, that give us something like batch files on the Mac. And because Frontier has a scripting language, it gives you the power to use logic, variables, IF/THEN statements, and more.

Frontier lets you access scripts in several ways: You can type the name of a script into the Quick Script window (similar to HyperCard's Message Box), you can attach the script to custom menus, or you can create small (around 2K) files called *desktop scripts*. Double-clicking on a desktop script opens Frontier (if it's not already open), passes the name and pathname of the desktop script to the program, and triggers the script inside the desktop file. This is where the similarity to DOS batch files comes in. The body of the handler in the desktop script can determine

what folder the file is in and perform some action on the files in that folder.

One of Frontier's most important components is its Object Database, which stores everything that Frontier knows how to deal with (including scripts, text strings, outlines, and numbers). The Object Database is hierarchical: Each item in the database can be a value or a separate set of items. These sets of items are called *tables*, and they look something like spreadsheets. The first column lists the name of the object being stored, the second lists the value being stored there, and the third shows the type of value at that location. You address the various elements in the database by providing addresses that are paths to each element. You'll get a better feel for working with tables and the Object Database as you work with the scripts in this article.

Removing Suffixes

Here's a simple application of Frontier's abilities: removing the *alias* suffix from a set of aliased files. I developed this script after I had made aliases of all my applications. The one annoying result was that I ended up with a score of files whose names all ended in *alias*. Manually removing the suffixes was a nuisance, so I wrote the script shown in Example 1 to strip text from the end of a filename. I've also used this script to remove suffixes — such as .txt — from downloaded files.

To create this script, open your own table by choosing the Open People item from

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POWER TOOLS

POWER PROGRAMMING

Frontier's Custom menu. This opens your personal table, which is a good place for storing your own scripts and other pieces of data. With the table open, choose New Script from the Table menu and enter the script in Example 1 exactly as shown. After you've typed the first line, press the Return key and then the Tab key once to indent the next line of code. Do the same after the `fileLoop` line. When you've typed the script and proofed it, compile and close it and choose Export a Desktop Script (under Export on Frontier's UserLand menu). You can save the file anywhere on your disk; call it KillSuffixes.

To use this desktop script, simply drag it into the folder containing the files whose names you want to modify and double-click on it. When you double-click on the desktop-script file, Frontier opens it. The `path` parameter in the first line of the script contains the script's name (in this case, KillSuffixes) and also provides a full path to the file.

Here's how the script works: First, it uses the `file.folderFromPath` verb to get the full path of the folder in which it resides. The script processes all the files in that folder.

The next line causes Frontier to ask you to type in the text of the suffix you want to remove. This suffix is stored in Frontier's scratchpad, which is simply a table in Frontier's Object Database. You can store this suffix in a local variable, but if you store it in the Object Database, the suffix you type will be offered as the default the next time you use the script. The suffix you type is then stored in a local variable. In Frontier, when you put the `@` character before a reference to a variable, you are either getting something from that variable address or telling Frontier to store something at the address pointed to by that variable name. In our example, the `dialog.ask` verb takes care of both functions: It gets the last value you stored in `scratchpad.suffix`, proposes it to you in the dialog box, and stores any value you type into the dialog box at that address.

The structure `fileLoop` in the fifth line of code performs the same operations (those that appear subordinate to it) on all the files in a folder. In this case, we are storing the name of each file in a variable called `fileName`.

Within `fileLoop`, for each file, the script uses the `string.hasSuffix` verb to see if the suffix you typed is in the filename. If it is, the statements indented

under the `if` statement are executed. The `msg` verb displays the name of each file in Frontier's main window. The script calculates the file's new name simply by subtracting the suffix string from the string containing the filename, and the `file.rename` verb renames the file.

Setting File Types by Suffix

You can also use Frontier to write a script that alters a file's creator ID based on the file's suffix. For example, you can change the creator of all .txt files to MSWD, for Microsoft Word, or MWII, for MacWrite II.

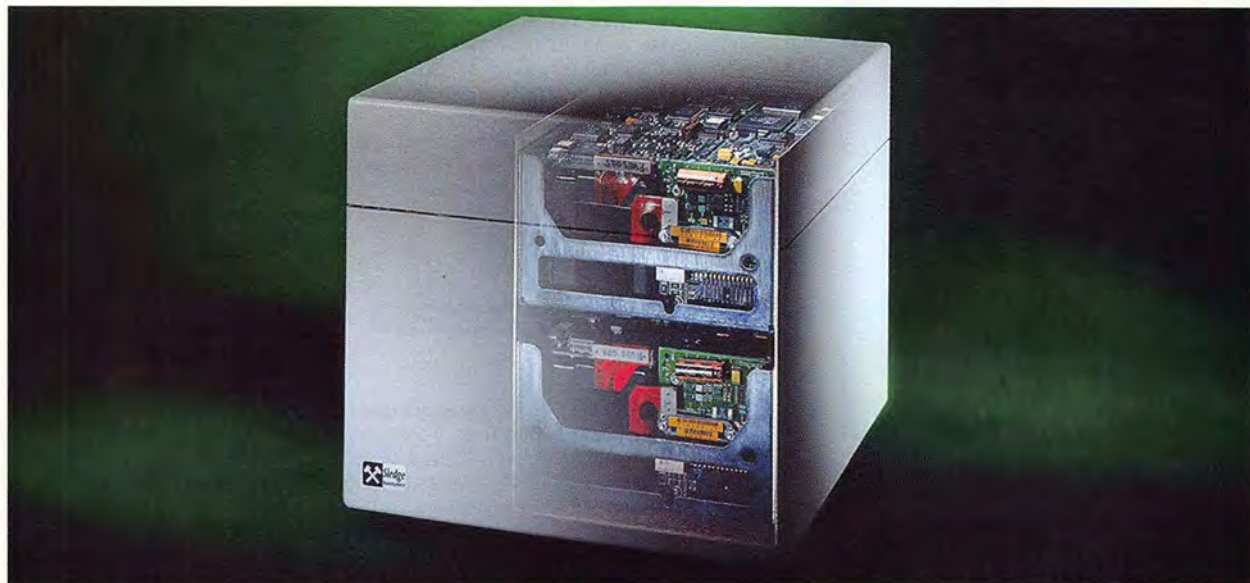
This script also uses a table in the Object Database. This table stores the suffixes and file types you want to change. I store it as a subtable of my personal table, which Frontier automatically created for me. You can also place it in the scratchpad. Use the Table menu to create another subtable; I've called this subtable Extensions. For each suffix you want to map to a file type and creator, create a new subtable; give it the name of the suffix you want to map; and create two string items in each of those subtables, one named Creator and the other named Type. Enter into those subtables the new values you want Frontier to assign.

As with the previous script, type the script in Example 2 exactly as shown, carefully reproducing the indenting. Note that the third line of this script begins with `on`. In this instance, we are defining a local handler that will be available to the `fixFileTypes` handler as it executes. You can also define this as a separate handler and store it elsewhere, but in our example, this is the only place where we want to use it. The `getSuffix` handler simply returns any period-delimited suffix that is part of the filename. Note that the previous script didn't rely on the period as a suffix delimiter.

The `getSuffix` handler uses the `string.patternMatch` verb to find a period in the filename. This verb is similar to HyperTalk's `offset` function — you pass to it the string you are looking for and the string you are looking in, and it returns a number indicating the location of the first string in the second. If `string.patternMatch` returns 0, there is no period-delimited suffix to the filename and `getSuffix` returns false; otherwise it returns the characters beginning with the period and extending to the end of the filename.

As before, the `fileLoop` portion of

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Kevin Curran, President, GCC Technologies

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POWER TOOLS

POWER PROGRAMMING

Example 1: KillSuffixes Script

```
on KillSuffixes (path)
    « prompts for & removes suffixes from files in a folder
    path = file.folderFromPath(path)
    dialog.ask("Type a suffix", @scratchpad.suffix)
    suffix = scratchpad.suffix
    fileLoop(fileName in path)
        if string.hasSuffix(suffix, fileName)
            msg(fileName)
            newname = fileName - suffix
            file.rename(fileName newname)
```

Example 2: Changing a File's Creator ID


```
on fixFileTypes (path)
    path = file.folderFromPath(path)
    on getSuffix (string) « return the suffix of string
        « is there a period in the string?
        startLoc = string.patternMatch(".", string)
        if startLoc == 0
            return (false) « no suffix!
        suffix = string.mid(string, startLoc, sizeof(string))
        return (suffix)
    fileLoop(fname in path)
        suffix = getSuffix(file.fileFromPath(fname))
        if not suffix == false
            extTable = "extensions" + suffix
            newCreator = extTable + ".creator"
            newType = extTable + ".type"
            « is there a table for this extension?
            if defined(extTable^)
                file.setType(fname, newType^)
                file.setCreator(fname, newCreator^)
```

the script works on every file in a folder. It first gets the suffix and, if there is one, checks to see if there's a subtable for that suffix in the Extensions table, using the **defined** verb. The **file.setType** and **file.setCreator** verbs then actually handle the file.

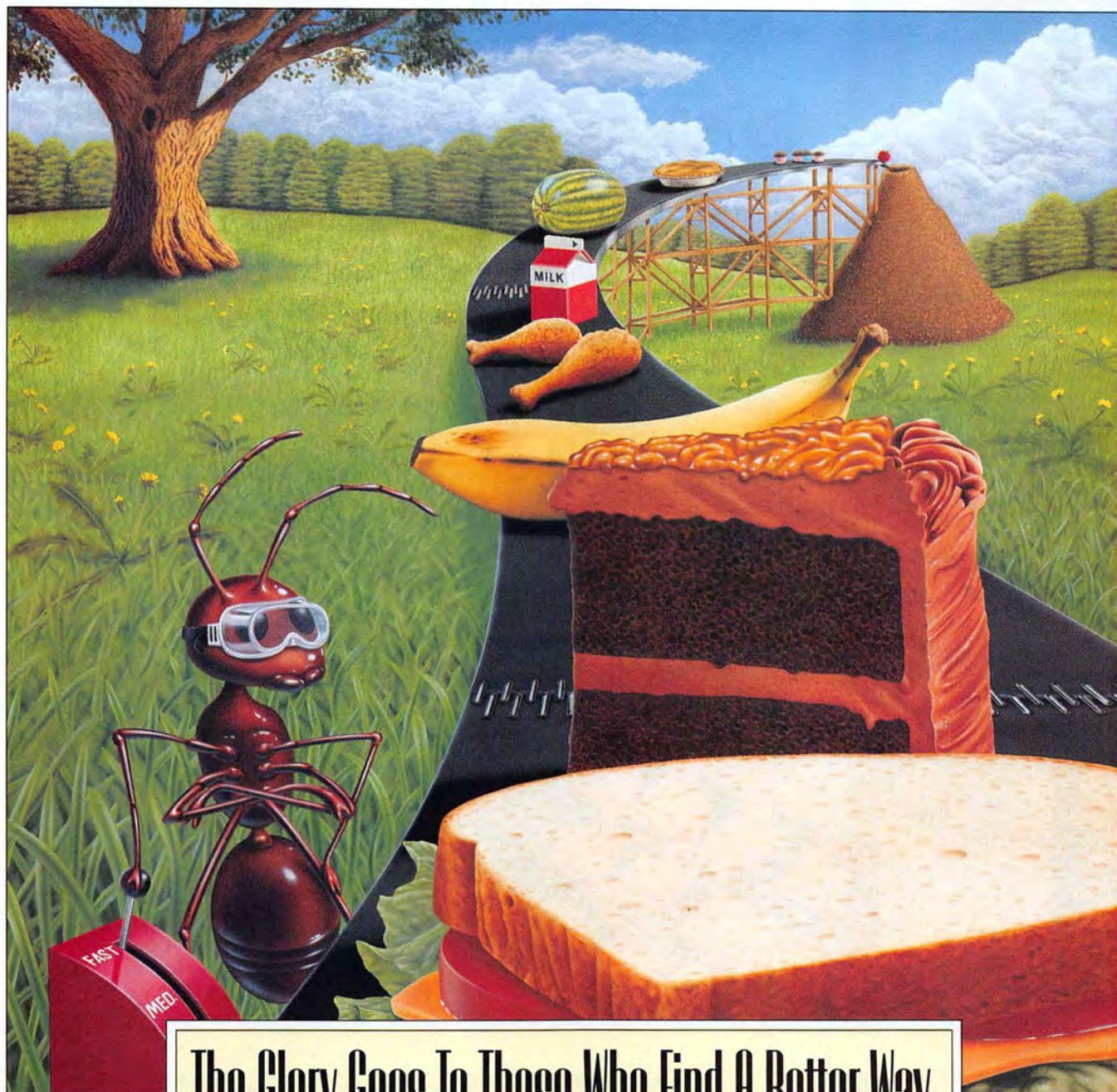
Referring to tables can be a little tricky. Earlier I mentioned that you refer to a location in the Object Database by using the **@** symbol. Here, however, we're keeping addresses in local variables and need to refer to them not as strings of text but as addresses. We use the carat symbol, **^**, when we refer to a variable containing an address. The call to the **defined** verb is saying, "Is there a table whose address is stored in the variable **extTable**?" A similar thing happens in the following two lines. The second arguments to the **file.setType** and **file.setCreator** verbs are saying, "Use the value stored in

the address that is stored in the variable **newType** or **newCreator**."

These two scripts' actions on files are based on characters contained in the filenames. Frontier also gives you tools for performing actions based not only on filenames but also on creation and modification dates, file types and creators, comments, and version information and even on the contents of text files.

You can download the scripts I've described here from *MacUser's* on-line service, ZiffNet/Mac. They're in Library 5 (Scripts & Templates) of the Download & Support Forum, under the filename **FRONSC.CPT**. Contained in the same file is a script for a user interface that lets you add new entries to the Extensions table. 

Steve Michel writes regularly on user scripting and other topics for *MacWEEK*.



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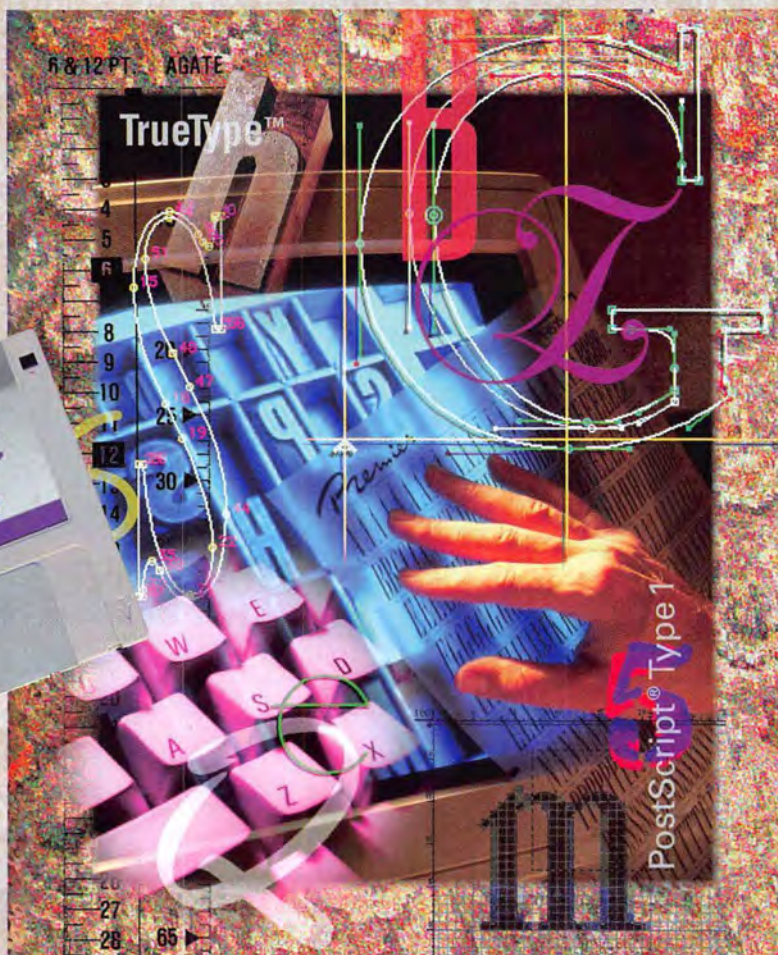
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Nobody ever said you had to live in Cupertino to be a Macintosh expert. Know-it-alls are everywhere, from Manhattan to Malibu — even in Waldport, Oregon, where we found our own Mac guru, Philip Russell. Each month Phil shares his own tips plus the best from the 70-odd Macintosh-user-group (MUG) magazines he reads each month. But Phil can't do it alone. To those whose undocumented Mac tip *MacUser* prints, we pay \$25, and the Reader Tip of the Month earns \$100.



Send your tip, together with your name,

address, and phone number, to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically via ZiffNet/Mac, the on-line service for *MacUser*. Send them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

By Philip Russell

Reader tips compiled by Gregory Wasson

■ A tip from the Visalia, California, MUG: Don't slide your hard drive across a desk. The rubber feet cause stuttering vibrations, which can crash your hard drive. Turn it off, pick it up, set it down, and turn it back on.

■ Ligatures, which join letters such as *fi* and *fl*, look nice, but if you're like most of us, you forget the appropriate keyboard

command equivalents that create them (Option-Shift-5 and Option-Shift-6, respectively). Type the letters normally, and then do a search and replace to change them to ligatures before you print.

■ Do you ever slide a reused disk into your Mac when you're using System 7 and find that it doesn't have the correct amount of empty space available? Check the Trash. It's probably bulging, because it remembers that you didn't empty it the last time you used this disk.

■ Speaking of Trash, my System 7 Trash doesn't bug me for permission to empty itself. I highlighted the Trash, typed Command-I (Get Info — also accessible on the Finder's File menu), and unchecked the box that tells the Trash to give me a warning. It's up to you. How careful are you? What chances do you want to take?

■ Do not buy one of those disk punchers that lets you make 1.4-megabyte disks out of 800K disks. You *will* lose data eventually. It may take a few months, but you *will* be sorry. I don't know how those punch people get away with their claims.

■ Sometimes novice Mac owners are afraid they'll plug the wrong cable into the wrong place. For these folks, I fold a simple address

label over the cord. On the label, I draw an arrow and an icon and print the name of the port to which the cable should be attached. Can't go wrong this way.

■ Here's how to speed up screen redraws and typing in many applications, particularly database programs: Make the application window very small by pulling up the bottom of the window so that only a few lines show.

■ Do you ever get the "PostScript Error: Undefined Offending Command" message when printing? This error can be caused by too much grouping in a graphic. Ungroup it, replace it, and try again.

■ A tip from the Association of Apple 32 Users: Do you find that opening a DA under System 7 defaults you to the Apple Menu Items folder in any ensuing Open dialog box? Here's a fix: Place the DA in the folder you'd prefer to see opened, and put an alias of it into the Apple Menu Items folder.

■ When you're copying files, does the Copy dialog box get in your way? Grab its title bar with the cursor, and hold down the mouse button until the cursor turns into an arrow. Drag the box to where you would like to see it. Release the mouse button, and this position is now the default. Move the Empty Trash and Find dialog boxes to new default positions the same way.

■ If you get messages under System 7 saying you've unexpectedly quit, try increasing the memory allocation for the offending program. Go to the application's Get Info box (Command-I), and alter the Current Size field.

■ Option-click on the desktop in System 7, and all open applications will be hidden.

■ If a keyboard command equivalent created with CE Software's *QuickKeys* selects the wrong menu item, because two menus

Reader Tip of the Month: Word 5.0

Word 5.0 allows two choices for automatically placing the date in a document's header, footer, or body: You can use either the Glossary or the Insert Date command. The Glossary command places the date as editable text, and the Insert Date command inserts a placeholder that updates every time the document is opened or printed. Both of these alternatives can be unsuitable in certain circumstances. For example, when you write a letter, you may opt for a fixed date from the Glossary, so you have a record of when it was sent, but later decide to send a copy with the current date. On the other hand, when you're writing a memo, the Insert Date placeholder may seem suitable — until you want to know the date of distribution and find that the placeholder shows only the current date. Ideally you need a date

placeholder that updates only on command.

Word 5.0's ability to embed objects provides a solution. First, choose Insert Object from the Insert menu and select Word Document. When the blank window appears, choose Insert Date. Close the window, and you have created what appears to be a regular date placeholder. This embedded object placeholder behaves differently from the simple Insert Date command, however. If you open the document tomorrow, today's date remains. If you want it to update, you simply double-click on the object to open its window and then choose the object window. To immortalize your date-on-command placeholder, define your formatted version as a Glossary entry.

Chris Paulu
Boston, MA

POWER TOOLS TIP SHEET

have similar names (PageMaker's Reverse and Reverse Line commands, for example), check the By Position button instead of the By Text button in the QuickKeys control panel before selecting the keystroke combination.

■ Unless you have a good reason to do so, don't create self-extracting files when compressing small files. You'll add unnecessary kilobytes, no matter which compression program you use.

■ The more I sit at my computer, the more I exercise. If that sounds like an oxymoron, listen up: I set a reminder program such as JAM Software's Smart Alarms or CE Software's Alarming Events to tell me to do some simple exercises each hour.

■ Put your ImageWriter ribbons into a plastic bag and

store them in the freezer. This prevents the ink from drying out.

■ Under System 6, 800K disks hold 779K, but they can hold 785K if you erase the disks under System 7. You'll have 785K even if you subsequently use the disks under System 6.

■ A tip from the Apple Corps MUG, of Memphis, Tennessee: You can address multiple envelopes by using the sheet feeder on a StyleWriter. Set an empty 3.5-inch disk box on the left of the sheet feeder to act as a stop. Set the page orientation to horizontal, and set the top margin to 6 inches and the left margin to 4 inches. Now load 30 or so envelopes (return address at the bottom, facing you), and the box provides a bottom guide for the envelopes.

Reader Tips

AppleTalk Remote Access

If you do a lot of communicating with a network, using ARA (AppleTalk Remote Access), here's how to dial a server, mount it, and go directly to any folder, no matter how deeply it's buried.

First, connect with the host network. Then select the server (don't forget to select "Save My Name Only" in the Chooser when mounting the server). Now select the folders you access the most, especially the ones that are really deep within your server's hierarchy, and create aliases for them. Drag the aliases to your desktop.

The next time you want to connect to your server and

want to avoid double-clicking through a bunch of subdirectories, just double-click on the aliases. After entering your ARA and server passwords (if applicable), you'll be where you want to be, minus a slew of double-clicking and waiting.

Karim Reum
Scarborough, ON
Canada

ZTerm 0.9

If you have a Hayes-compatible modem and use the shareware program ZTerm (version 0.85 or 0.9), here's how to deal with phone numbers that are constantly busy — toll-free numbers for concert- or sports-ticket ordering, radio stations running contests, or the police when there's an armed intruder in your house. Enter the number

It's a graphics program. It's a business program. Is not.

The image shows three overlapping magazine covers. The leftmost cover is titled "SURF" and features a stylized illustration of a surfer riding a wave. The middle cover is titled "Technical Production Procedures" and displays a complex organizational chart with names like Robert Kessler, Rick Long, Barbara Nelson, Carlos Munoz, Lee Mason, Bill Lowrey, and others, organized into three teams. The rightmost cover is titled "VISION MAGAZINE" and features a portrait of a person wearing glasses. The text "It's a graphics program. It's a business program. Is not." is written across the top of the covers.

in the directory list, and the next time you need to call that number, just dial it with ZTerm, which keeps dialing the number until it rings. When it rings, pick up your regular phone and quit ZTerm or turn your modem off.

Make certain that your modem speaker is on so you can hear when it starts ringing. Type `atm1` to turn on the speaker and `at13` to have it at maximum volume. Type `ats11=50` so the modem dials at maximum speed.

Saurabh Misra
Raleigh, NC

Clipboard (System 7)

When you double-click on System 7's Clipboard file, in the System Folder, the Clipboard window appears on your desktop. To access the Clipboard in applications that

don't have a Show Clipboard menu command, select the Clipboard file and make an alias of it. Put the alias on your desktop or in the Apple Menu Items folder. For easy access from the Apple menu, put one or two spaces before the Clipboard alias' name, and it will appear at the top of the menu.

David Black-Schaffer
Winchester, MA

FileMaker Pro

Here's a hint for anyone who enjoys using buttons in FileMaker Pro but doesn't like making them from scratch. In System 7's Finder, select an attractive or representative icon and choose Get Info from the File menu (Command-I). The laser-printer icon in the Extensions folder makes a great Print button, for ex-

ample. Select the icon in the upper left corner of the window, and copy it. Switch to FileMaker Pro, and paste the icon into your layout. Finally, choose Define Button from the Scripts menu and attach the icon to a command or script.

Brian Ballek
San Jose, CA

Excel 3.0

Excel 3.0 has a big-time bug. If you try to copy a lovely 3-D graph and paste it into a drawing program such as MacDraw or Canvas, all you'll get are a few miscellaneous lines and some garbled text. You can fix this problem with a shareware extension called ChartPaster. It works like magic — toss it into the System Folder, and suddenly you can cut and paste Excel

charts with no trouble.

Howard Tiersky
Los Angeles, CA

[ChartPaster is available from on-line services and user groups. It's on MacUser's on-line service, ZiffNet/Mac, in Library 3 of the Download & Support Forum (filename CPASTE.CPT). Another fix is to upgrade your copy of Excel to version 3.0a. Call Microsoft tech support at 206-635-7080 for details. — Ed.]

Note Pad (System 7)

Make an alias of the Note Pad DA, and drop it into the Startup Items folder. Whenever you turn on your Mac, the Note Pad will pop up and display whatever reminders you've jotted down.

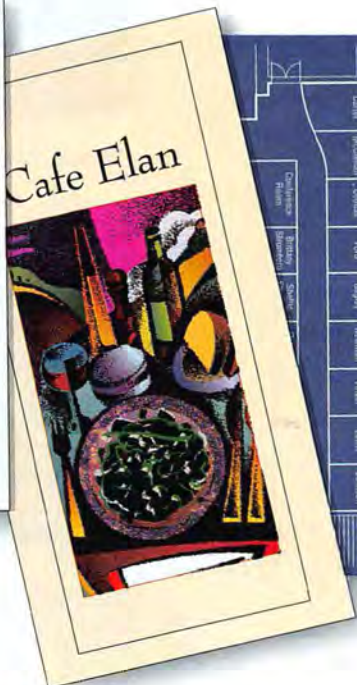
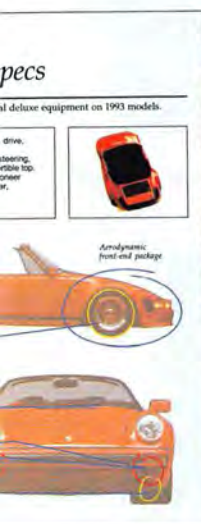
Nicholas Ursa
North York, ON
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LC & LCII	◆	◆	◆	◆	◆	◆	◆	◆	◆
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Questions anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling *Dr. Macintosh*, second edition. Andy Ihnatko is a longtime activist with BCS•Mac. They're both ready to answer your questions about everything Macintosh.



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Andy (72511,204), or one of
the other *MacUser* experts.
See the masthead in this
issue for instructions on
how to sign up.

By Bob LeVitus and
Andy Ihnatko

Words to Build On

Q. I can't open a document without first opening the application that created it. If I double-click on a document on the desktop, I get a message that says the application can't be found. What's going on?

Dick Peller
via America Online

Bob: I guess it's time for our annual rebuild-the-desktop answer. Hold down the Command and Option keys when your Mac starts up, and keep holding them down until you see a dialog box that asks, "Are you sure you want to rebuild the desktop file?" Click on OK.

In case you're wondering how something so simple can be the solution, here's the scoop: On every disk, the Mac stores an invisible file called the Desktop (under System 7 it stores two invisible files — Desktop DB and Desktop DF), which keeps track of where things are stored and which applications are available for opening documents. However, the Desktop file isn't a very good housekeeper — it sometimes retains information about files that have been deleted. Desktop files also tend to become corrupted or damaged over time, which can lead to system crashes, disks that don't mount (which means that their icons don't appear in the Finder), or "Application can't be found" messages.

For years I've advised users to rebuild their

desktops every month or two — it's an excellent form of preventive maintenance. The only ill effect is that you lose any comments typed in the Get Info windows (the ones that appear when you select an icon and type Command-I or choose Get Info from the File menu) of everything on the disk. It's a small price to pay, however.

Andy: And now that we've answered a desktop-rebuild question, our liquor license is good for another year. Sorry for the inconvenience, readers, but state law is state law.

The Bermuda Rectangle

Q. Please apply your superior mental capacities to my problem with FreeHand 3.0. Recently I noticed a tiny gray rectangle just to the left of the left arrow on the bottom scroll bar. Clicking on this mysterious rectangle once makes its top half turn white or disappear. Clicking a second time makes the whole rectangle disappear, and clicking a third time restores it to its original gray. You probably think I've spent hours clicking on this stupid gray box and watching it change color. Well, OK, I have. I can't get any work done because this ghastly thing is sitting smugly in its corner, daring me to figure out what it's doing there. I've even read the manual from cover to cover, but no luck.

Linda Horn
Vancouver, BC
Canada

Bob: Linda, I hate to tell you this, but the

* ... But Were Afraid to Ask

Before we get started this month, here's a special note to all of you who read my lame joke last year about turning a Mac 512K into an aquarium and were moved to write in asking how to actually *do* it. As incontrovertible proof that (a) no question is too dopey for this column and that (b) I *really* need to find me a hobby, a wife, or *something* to occupy all this free time, I have, after months of tireless and secretive experimentation, created my own Macquarium conversion kit for you, the home viewers. For thrilling action photos and info on how to get a complete set of plans and instructions, turn to About MacUser in this issue.

Now, will *someone* please send me a dumb question that I can base a tax-deductible trip to DisneyWorld on? If you prefer not to reveal your true identity, mum's the word. We'll say your question was sent in by a quaint olde English eating device, selected at random.

Q. This has been bugging me for a long time: What exactly is that stuff that accumulates on my mouse's rollers, how does it get

there, and what's the proper way to get rid of it?

Porringer
A type of shallow cup

Andy: You wouldn't know by just looking at it, but that black crud is actually bad karma, the tangible psychic residue of evil thoughts and vile deeds. The sheer intensity of the bad karma in the Mac community often sublimates into nasty black bands around the mouse's rollers.

Normally, eliminating bad karma means spending your next lifetime in a lower state of existence, but getting it out of your mouse merely involves unscrewing the base plate and gently picking the crud off with a toothpick. It should slide off the rollers easily — in one continuous strip, if your fingers are nimble enough. Or you can buy a mouse-cleaning kit at a computer store, which does basically the same thing but costs more.

To avoid buildup of unsightly bad karma in the future, try using a clean mouse pad instead of rolling your mouse around on that filthy bare desktop of yours.

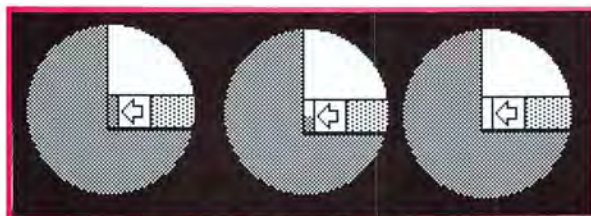


Figure 1: FreeHand's puzzling smooth-dragging control in all three of its states (from left): completely gray (elements draw and move smoothly), half-gray and half-white (elements may flicker a little if they are complex), and white (insufficient memory to draw elements perfectly smoothly). This control lets you determine how the program uses memory.

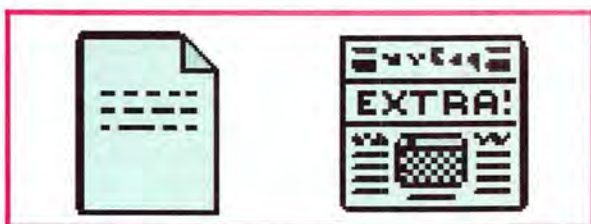


Figure 2: The regular TeachText icon (left) changes to the "neat" version (right) when you create a read-only version of a document. To perform this magic, you need to know how to change the file type by using ResEdit or a similar program. Alternatively, if you have System 7, you can copy and paste the icon of the TeachText document.

answer is right there on page 45 of the user manual, in the first chapter, "Aldus FreeHand Basics." It seems that the Bermuda rectangle is nothing more sinister than FreeHand's smooth-dragging control, which lets you control how the program uses memory. When it's completely gray, elements draw and move smoothly; when it's white, not enough memory is available to draw elements perfectly smoothly, so they may flicker when you release the mouse button; when it's half-gray and half-white, elements generally draw smoothly but may flicker a little if they are complex (see Figure 1).

If the control is half-gray or all gray, you can change its state by clicking on it (as we both discovered), with little or no visible effect on-screen. By default, FreeHand sets it to all gray, but it automatically switches to half-gray or white when program operations require more memory.

I Think Icon

Q. How can I get TeachText to save files with the neat icons that developers use for their Read Me files?

Paul Schreiber
Burlington, ON
Canada

Andy: The TeachText icons are "neat"? Neat? To paraphrase Madonna in her magnum opus, *Truth or Dare*, anyone who thinks the TeachText icon is neat has got to go!

Well, Paul, there are two kinds of TeachText-document icons, because there are two kinds of TeachText documents. The plain-vanilla document you create and save has the dull icon shown on the left in Figure 2. The newspaperlike deal on the right is a special read-only document that can be opened, read, and printed but not edited. That's why it's used for Read Me files in commercial software — so your kids can't replace that essential, last-minute info with their reports on the solar system.

Saving a file as read-only is just one of the many TeachText features you can't get at from any menu. To make a read-only file, save the document as usual and then use Apple's resource-editing software, ResEdit, to change the document's file type from TEXT to tro (lowercase — it matters). (ResEdit is available from user groups or on-line services, in CE Software's DiskTop, or in any other file-diddling utility.) To change the document's file type by using ResEdit 2.1.x, open the file and then choose Get Info from the File menu. Select the letters TEXT in the Type field, press the Delete key, and type tro. Don't change the Creator (it should be ttxt). Save the file and quit. The file will now have that beloved newspaperlike graphical entity you covet so.

Bob: Although the worst thing you can do if you follow our instructions is lose a text file, I feel obligated to include our standard ResEdit disclaimer: *Never use ResEdit on a master or original file; always work on a copy.*

[There's a simple, although nonautomatic, solution to this problem that's even safer. Because Paul wants only the TeachText document's icon, he can take advantage of the fact that System 7 lets you copy and paste document icons. With a read-only TeachText document's icon selected, go to Get Info, on the Finder's File menu; click on the icon in the top left corner; and choose Copy from the Edit menu. Do the same to the document whose icon you want to change, but choose Paste instead of Copy. You now have a new icon on your document. — Ed.]

SuperDrive Time

Q. I recently purchased a Mac Classic II. It's great, except that my disks have a compatibility problem with two of

the four Mac SEs I use at school. The two Macs fail to recognize any disk I try to use as Macintosh-based, so I get a dialog box asking if I would like to initialize it. What's the problem?

Kenny Wilson

Winston-Salem, NC

Andy: Well, first off, this is a good spot to mention that if your Mac ever asks you if you want to initialize what you thought was a perfectly good disk, *don't do it!* One of the many differences between a Mac and the Pope is that only the latter is infallible. When a Mac says a disk is unreadable or isn't in Macintosh format and blah, blah, blah, it's just saying that it can't make sense of the disk and thinks reformatting would help immeasurably — much as four out of five dentists agree that a good swift beheading is your best defense against tooth decay.

Anyway, the point is that most of the problems that result in a "Would you like me to reformat this disk?" dialog box are easy to solve with a disk-recovery tool. And in your case, the problem isn't even as complicated as that. You see, the Mac SE began life with drives that read standard double-density 800K disks. Then somewhere around the Middle Ages (late 1990 or so), Apple began outfitting SEs with high-density 1.4-megabyte disk drives (SuperDrives, in marketing weasels' parlance). As the owner of a thoroughly modern Mac, you have a SuperDrive, which can read and write both formats. Older Macs, such as Mac SEs, are usually outfitted with drives that can use only disks formatted for 800K drives. When you stick a high-density disk into an 800K drive, the Mac can make neither head nor tail of it and asks if you want to destroy all your hard-earned data.

It sounds as if two of your school's SEs were either

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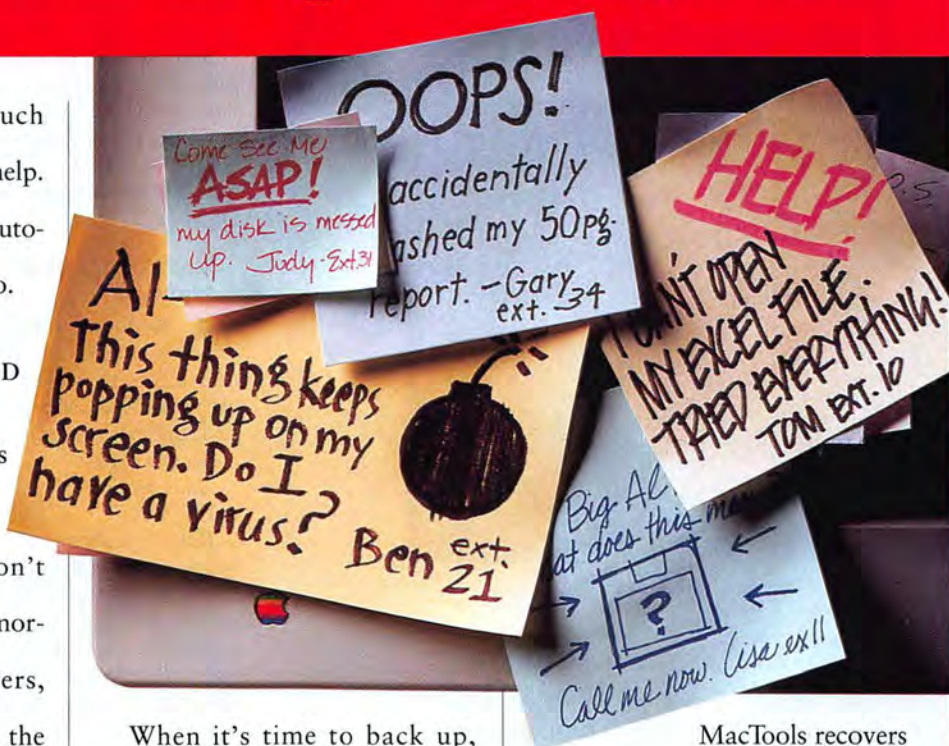
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POWER TOOLS HELP FOLDER

manufactured late enough to have SuperDrives or were upgraded at some later point in life. Here are your solutions: Either use the school's SuperDrive SEs, or, before you leave the house, copy the files onto a disk formatted in the standard double-density format. (When your Mac asks you how you want a new disk formatted, click on the 800K button. That way the disk can be read by any Mac made since 1986.)

Bob: All of what Andy says is correct. If the disks you've been using are 800K disks, however, call a qualified repairperson. The drive on your Mac at home may be out of alignment.

Most Overvalued Players?

Q. Why are CD-ROM drives so much more expensive than CD players? The cheapest CD-ROM drives are more than *twice* the price of an audio-CD player.

Andy Johnson
Ely, MN

Bob: You know, I've always wondered about that, so I went straight to the horse's mouth (an Apple spokesperson) and was told that the high prices reflect that CD-ROM drives are "used in data environments that stress reliability and performance." Translated, that means that when you play an audio CD, you probably don't notice if a note or two is lost, but you'd definitely notice if your CD-ROM didn't read data accurately.

You also want your CD-ROM to be fast, whereas audio should be played at a constant rate. So you're paying for reliability, performance, and the additional electronics needed for error detection and correction. Plus there's a SCSI controller (or comparable interface) for connecting a CD-ROM drive to a computer and a data buffer for improving data-transfer rates.

And then there are good old

economies of scale: Millions of audio-CD drives are produced per month, whereas there is not yet a CD-ROM drive on every desk. Pay particular attention to this last point — as the market for CD-ROM drives grows, prices will drop. Mind you, they'll never be as cheap as audio-CD drives, but you can bet they'll be cheaper a year from now and even cheaper a year after that.

My advice is that if you want or need one, buy a CD-ROM drive *now*. They're not going to get that much better or cheaper in the next couple of years. John McWade, publisher of one of my favorite newsletters, *Before & After*, says, "There is no 'right' time to buy. Tomorrow's equipment will always be better and faster. It doesn't matter." I couldn't agree more strongly.

Andy: That's so true. If you need something and can afford it, then buy it. It's always a little depressing to see the Product X you bought just six months ago become cheaper and more powerful, but the point is that if you had waited, then you wouldn't have had Product X for that time.

Hear my sad song, and learn well: I'm writing this missive on a Mac Plus. It's my main Mac, chiefly because for the past three years, every time I made plans to upgrade to new equipment, I got a phone call from someone with rumors about what would be coming out next year and wound up holding on to my money. Sure, the Mac IIx I almost bought would've been obsolete as of two years ago, but at least I wouldn't have spent the past three years on a slow-as-hades, black-and-white computer that doesn't even have a Control key on the keyboard. The gas money alone that I've spent having to go to the BCS•Mac office every time I need to do color work could've paid for a Quadra 700!

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POWER TOOLS HELP FOLDER

PageMaker/Quark Défente

Q. I am trying to cure myself of what a friend thinks is an ill-founded allegiance to PageMaker, so I'm thinking of buying QuarkXPress. Before I give it any more thought, however, I need to know if there's a way to translate my PageMaker spreads to QuarkXPress. As far as I know, neither program can open a file created by the other. Is that true?

Jon Kirsch
Hartford, CT

Andy: The disadvantage of having two major DTP programs out there is that the Mac world is full of Quarkians and PageMakerites, each one sure the other group is nuts and, even worse, each possessed of such rabid evangelism as to make the Crusades look like an extended PR campaign. I'm a Quark guy, and Bob favors PageMaker. I have seriously suggested he have his house tested for radon pronto.

And I am not just saying that because I'd like Quark to send some of their cool T-shirts to me, Andy Ihnatko, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404. One of the many things I like about Quark is its XTension system. The program itself has many cool features, and you can add new ones anytime by getting an XTension file for that feature and dropping it into your Quark folder. There are commercial, shareware, and public-domain XTensions for every task imaginable, from adding dippy sounds to certain Quark activities to automatically preparing an entire classified-ad section. But the XTension that gave me an excuse to launch into the preceding screed on QuarkXPress' niftiness is an XTension from Quark itself: Aldus PageMaker Import. You can get Aldus PageMaker Import XTension free from on-line services such

as America Online or CompuServe or from Quark (1800 Grant Street, Denver, CO 80203; 800-788-7835 or 303-894-8888) in a \$25 package that includes some other cool XTensions.

As its name implies, the Aldus PageMaker Import XTension enables QuarkXPress to translate a PageMaker publication into QuarkXPress format. The XTension was written without Aldus' involvement, so it's not completely foolproof, but it transmogrifies most PageMaker documents just fine, allowing you to edit and modify everything exactly as if it had been created in QuarkXPress.

There's no way to convert a QuarkXPress document to PageMaker format, but here's a handy tip for transferring pages from one page-layout program to another: Individually print each page you want to export, using the LaserWriter driver's Print to PostScript option (you'll usually find it right in the Print dialog box). Then place the PostScript files as full-page graphics in the foreign DTP program. You won't be able to edit any of the page elements, but this method is perfectly suitable for using a QuarkXPress page as part of a PageMaker document.

Bob: Aldus includes Aldus Additions, a technology similar to XTensions, in PageMaker 4.2. Although there isn't an Addition for importing QuarkXPress documents into PageMaker, there are already several cool Additions, with many more on the way.

I have nothing against QuarkXPress. I know lots of people who swear by it. I just find PageMaker better suited to the kind of work I do—creating very long documents. If my job were to create four-color ads for glossy magazines, I might feel differently; but because it's not, I don't.

Have my house tested for radon? Sheesh! ☹

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This Month on ZiffNet/Mac

ZMAC UTILITY

A PowerBook's battery life depends on a lot of variables, and keeping track of how much life is left in your battery involves more guesswork than science. Apple's Battery DA requires that you keep it running in the background. Even if you do, though, it's easy to lose sight of it whenever a window opens, and that leaves you in the dark about how much charge is left. CellMate, this month's exclusive utility from *MacUser*, gives you an easier view of the battery level with a convenient indicator icon in the menu bar.

CellMate's unobtrusive icon looks like a D-cell battery and rests on either side of your menu bar. As the battery loses power, the gray fill in the icon decreases. Because Apple's internal modem drains battery power quickly, CellMate also lets you know if the modem is active, providing a convenient reminder to turn off your telecommunications program.

CellMate is available only on ZiffNet/Mac and can be downloaded without a connect-time charge. Until August 25, you can simply type GO ZMC:POWERTOOLS. After that, you'll find the file CELMAT.CPT in the Download & Support Forum (GO ZMC:DOWNTECH).

By Ben Templin

PowerTalk on PowerBooks

PowerBook power user Rich Wolfson is on-line this month to answer questions from MacUser Forum users about the quirks and advantages of using Apple's littlest (but not least) computer. Wolfson, a MacUser Forum regular, recently completed a book on the PowerBook called *PowerBook Companion* (Menlo Park, California, Addison-Wesley, 1992, \$24.95). Wolfson will host a discussion from August 10 to 15 and be available for questions — anything as general as how to conserve battery power or as complex as how to take a PowerBook apart. Leave your questions in Message Section 9 (Guest of the Month) of the MacUser Forum (GO ZMC:MACUSER).

Hot PowerBook Files

This month's selection of shareware and freeware features a set of utilities and files to make using your PowerBook easier and help optimize its battery life. To make locating the files easier for you, the CompuServe filenames are in parentheses. All the files listed here can be found in the Download & Support Forum (GO ZMC:DOWNTECH).

Boston II (BOSTON.CPT) is generally considered the most legible bit-mapped font available for the ImageWriter. Although it is a relatively older font, Boston II has recently been rediscovered by PowerBook users, who find it highly legible. Shareware, \$10.50. 124K.

Caps Lock Notify Extension (CAPSLO.CPT) indicates whether the Caps Lock key is pressed. Freeware. 2K.


Cursor Beacon (CURBEA.CPT) is a System 7 control-panel extension that lets you easily find the cursor when it disappears on PowerBook LCD screens or large monitors — a ZiffNet/Mac exclusive. Freeware. 24K.

CursorFixer v.1.0 (CURFIX.CPT) is a system extension (INIT) that replaces selected cursors with user-configurable substitutes. It was written specifically to help PowerBook users who have complained about the thin I-beam text-entry cursor. Freeware. 6K.

iContraption (ICONTR.CPT), the "Icon Family Moving Machine," is a System 7 utility designed to make using and manipulating Finder icon resources relatively easy. It requires no ResEdit hacking and includes a FatBits editing feature. Shareware, \$20. 84K.

PBTools (PBTOOL.CPT) contains two programs: SafeSleep and SpinD. SafeSleep is a system extension that blanks the screen when the PowerBook goes to sleep and requests a password when a sleeping Mac is awakened. SpinD is an Fkey that spins down the PowerBook's hard disk to conserve battery power. Freeware. 8K.

PowerBook Numeric Keypad Keyboard Layouts (PBKEYS.CPT) remaps your PowerBook's keyboard layout so you can have a numeric keypad by using the Option and Control keys. Freeware. 6K.

PowerOrgasm (PORGAS.CPT) is a novelty extension for PowerBooks that plays a sound whenever you plug in the power adapter. The default sound comes from a famous scene in *When Harry Met Sally*, but you can customize it with ResEdit to play any sound you want. Freeware. 93K. 

Zmac Tip of the Month: Access on the Road

Have you ever unplugged the phone in your hotel room and gotten your modem and PowerBook all hooked up, only to realize that you didn't know what the local CompuServe access number was? Instead of reconnecting the phone to call CompuServe, find the right access number with your PowerBook and modem: Using your telecommunications program, dial 800-346-3247.

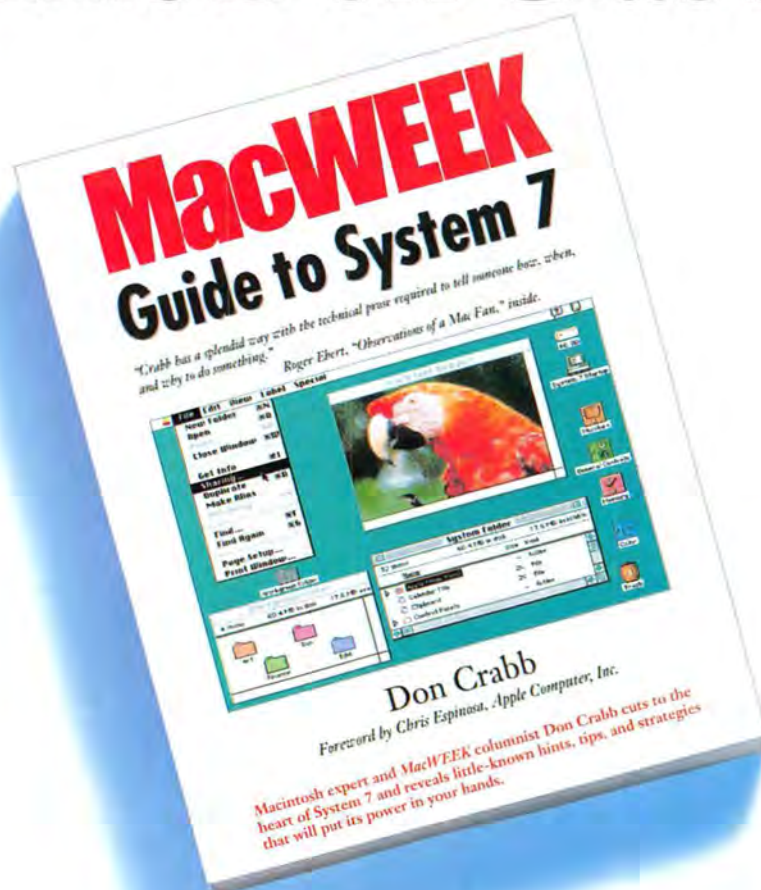
At the Host Name: prompt, type PHONES and press Return to get into a database that gives you the local access number based on

the number you've called from. This search method is not an exact science, however, so you should always recheck the number once you're on-line to see if there is a closer access number.

CIM users can do this trick with CIM's built-in terminal emulator (on the Special menu), but you have to type the letters ATDT followed by the access number to make a call.

If you remember you need a local access number while the phone is still hooked up, call CompuServe at 800-635-6225.

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ClarisWorks has redefined the concept of integration. In the past, other products have been assembled under a menu system and labeled "integrated." They were in the same box, but they didn't really work together. These packages were often fat, requiring too much memory; and slow, because moving between them meant closing one and opening another.

Why Bother? ClarisWorks has developed the ultimate integrated environment, wherein all six programs live and work together. Create great-looking newsletters, brochures, reports and more. Just click the tool you need and the menus and commands change automatically. You get a WYSIWYG display, so you can see what your document will look like when it's printed — and an on-line spell checker and 660,000-synonym thesaurus. This sleek integration means students and novice users can experience new uses for their computers.

Engineered elegantly into just 580K, ClarisWorks is a must for PowerBook users, and the perfect package for new users. Creating a document with text, graphics and charts is truly simple, and you'll do it as if you were working in one program. The ingenious integration makes it very comfortable. And of course, there's context-sensitive and balloon help for just about everything.

The programs themselves are not trimmed-down, also-ran programs. They are from Claris, a leader in the Macintosh market. These programs feature the same proven interface you'll see in dedicated Claris applications like MacWrite II, MacDraw Pro, Claris Resolve and FileMaker Pro.

Word Processing. The Heart Of ClarisWorks. The heart and soul of your system. Your word processor. ClarisWorks features one of the best in the business. Bring it up and format a page in no time flat — set up custom tabs, margins, indents, line spacing and justification. Use your choice of fonts for just the right look. Quickly create pro-quality mail merged letters, using the database, and send them to everyone on your mailing list.

Ready to get fancy? It's easy with ClarisWorks' multiple columns, headers and footers, link frames so type flows smooth as silk between columns, around graphics and more. Hey — you can also rotate type sideways if you want, great for charts and special effects.

Spreadsheet Power. Would you believe there's over 90 built-in functions? You can construct sophisticated models using the mathematical, statistical and financial features. You'll answer tough questions fast with ClarisWorks' powerful time, date and logic capabilities. You also get complete formatting control to create vari-



ous column widths, row sizes, character formats and borders. Formulas are extremely easy to create and use — to unleash the power that you need for nested complex functions.

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\$400. to \$599.95	\$12.95
\$600. to \$999.95	\$14.95
\$1000. +	\$16.95

Shipping for Printers, Monitors, CD-ROM sets are billed actual cost.

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The Fastest CD-ROM Reader In The World: Just \$399!

REVIEWER'S NOTEBOOK: If you're ready to get into CD-ROM, Tiger has a spectacular offer on the fastest reader in the business. The NEC CDR-73, with a remarkable 350 millisecond response time — for just \$399! Compare — you won't find a CD-ROM reader with this much muscle with a price tag this modest.

The only thing left to buy is the interface kit (deeply discounted to just \$79, including cables, terminator software and earphones) and you have the hottest drive in the business, growling, snorting and ready to rip into hundreds of megabytes of data.

Tiger is making this offer because we want to bring the magic of CD-ROM to everyone, and at this price you can afford to put this great technology on your desktop.

We've also assembled a low-cost bundle of the most popular CD-ROM titles into what we call the Tiger Reference Pack. It includes: The CIA World Fact Book, TIME's Desert Storm on CD, Toolworks Illustrated Encyclopedia, World Atlas, US History, Time-Table of History: Science and Innovation and Family Doctor. Plus, we'll throw in a pair of Persona Micro

Speakers for the Mac so you can hear the sounds of these great CDs. That's over \$1400 worth of current CD-ROM software and accessories for just — are you ready for this? — Just \$179!

There's simply NEVER been a better deal on CD-ROM. Don't even bother looking anywhere else. You've always trusted Tiger to do the shopping for you — and get the best price.

If you add the whole thing together — the CDR-73, Reference Kit and Interface, you've got the hottest bundle in the business for just \$657. Retail on these items is over \$2000!



REFERENCE KIT INCLUDES

Persona Micro Speakers	\$80.00
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Timetable: Science & Innovation	\$99.95
Family Doctor	\$149.95
Total Value	\$1400.00

YOURS FOR ONLY \$179!

NEC CDR-73

BCC8173 CDR-73 Drive Interface	
not included	\$399.00
BCC8215 Mac Interface Includes Cable, Terminator, Software and Earphone	\$79.00
BCC8399 Tiger Reference Kit	\$179.00

Fast, Easy Charts For Absolutely Any Purpose!

REVIEWER'S NOTEBOOK: Three exceptionally well designed charting programs from Kaetron: TopDown, FlowChart Express and OrgChart Express (it's brand new). Each product provides the most extensive feature set we've ever seen for their particular task. Each is beautifully designed — anyone can use them without even looking at the manual. Kaetron has engineered clean, snappy Mac interfaces into these programs, and they are actually fun to use.

TopDown enables you to create corporate charts, system designs, training materials and procedure charts in a snap. FlowChart Express puts the most sophisticated tools for any type of flow chart (using ANSI standards) right at your fingertips. You'll whip out work flows, paper flows, office procedures, chains-of-command, business plans and more.

New OrgChart Express continues the tradition

with powerful, simple Organizational Chart tools.

TopDown. The SuperCharged Design Tool. Charts and diagrams with minimal effort. Just open TopDown and you have the fastest, easiest, most convenient charting tools just a click away. Create anything from a simple procedure chart to complex system definition. TopDown contains 36 standard symbols — just click and it's positioned in place in your chart (you can also create your own custom symbols). Connecting lines are simple, just two clicks does it. And if you rearrange your charts or resize boxes, TopDown automatically redraws the lines.

Save Time, Save Effort. Charts and diagrams used to be a lot of work. TopDown takes the labor out of the process with a host of great features. Choose from ANSI and other standard symbols, place lines, add captions and patterns, structure chart symbols as a custom font, colorize your charts and more.

TopDown makes use of the Mac's familiar click-and-drag drawing method, and features a revolving palette that keeps your workspace uncluttered. There's plenty of on-line help (although you probably won't need it) and you can keep the details hidden until you need them.

Moving through TopDown couldn't be easier, just pop up a menu and select to move between drawings. Insert anchor points into drawings to act as bookmarks. Split your screen horizontally or vertically so you can see more than one drawing at once. Handy Offscreen connectors

connect charts that run off the page. Import and export drawings as PICT files.

NEW! OrgChart Express

REVIEWER'S NOTEBOOK: The fastest, easiest way to create organizational charts on your Mac. So powerful, it makes drawing downright simple. So flexible and feature-rich, that it becomes an important personnel management tool.

Create color-coded org charts, move employees, revise structures and more — all with sleek drag-and-drop ease. A powerful database keeps track of all your essential employee information like job description, office phone number, salary and more. OrgChart Express' search and sort capabilities can find just the right person for any assignment.

OrgChart Express is System 7 savvy and offers definable styles, zoom in and out, one time data entry, aliases (a person occupying more than one position), password protection, auto alignment and more.

- **Personnel vs. Position Information:** When creating a field, you can specify whether the fields pertain to the position or the person.
- **Sort in a List View:** Personnel window is sorted using the same criteria. Provides an easy way to make mailing or phone lists.
- **Occupying Multiple Positions:** Allows you to create org charts that are grouped by function rather than by person.

KAETRON

BCC2909 FlowChart Express	\$94.90
BCC2910 TopDown	\$215.90
BCC2910B TopDown Upgrade	\$129.95
BCC2911 OrgChart Express	\$125.90



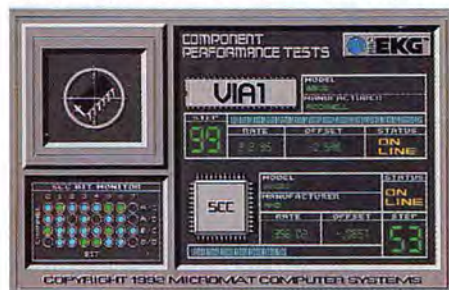
AVOID SIMPLE CONFLICTS - AND LETHAL FAILURES!

New MacEKG Spots Trouble Before It Strikes!

REVIEWER'S NOTEBOOK: The Mac used to be a simple machine. It was a 128K write-and-paint-wonderland, the system folder was just a boot-up utility and the applications were limited. It was a computer for the rest of us...

People who bought Macs way back when, circa 1984, paid more than they would have for a stodgy DOS machine, but they didn't mind — they knew the potential of the fun-loving box with the monitor built in and the cute little icons.

They were right. The Mac has grown up, becoming a powerful and mature business tool in its own



MacEKG tests individual hardware components to seek out possible faults — before they become major problems. The VIA (Versatile Interface Adaptor) chips handle all user input like the mouse and keyboard. A faulty VIA can cause inconsistent cursor movement, and if allowed to get worse, complete system shutdown.

right. Today, the Mac enjoys a starting role in a variety of businesses, from graphic designers, to CEOs to television producers. The Mac can run spreadsheets with the big boys, produce pro-quality type, 3-D animation and more.

With this amazing growth, the Mac now has some serious responsibilities. It must handle CDEVs, extensions, scanners, viruses, magabyte drives, virtual memory and voice recognition.

That means your Mac must be modified for the way you work — and what type of work you do. And

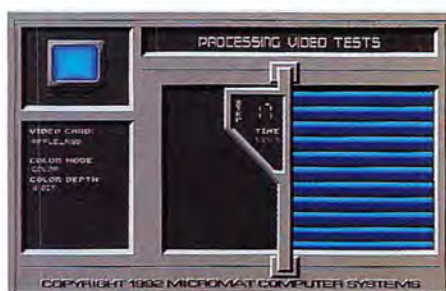


If EKG detects a substantial decrease in performance, it displays a warning and directs you to the offending part. This is precisely what any technician needs to know to repair a Mac.

that opens the door for possible problems. Drop an extension into your Mac's system folder and watch the fireworks!...

MacEKG is the most advanced, easiest-to-use system diagnostic program we've seen, helping you prevent problems before they even think about occurring. You can run a series of tests and get immediate, understandable results on what's going on and what's going wrong. MacEKG watches your system with a set of features that used to be available only to Authorized Apple technicians. Moreover, some of the routines included in MacEKG are not available anywhere else.

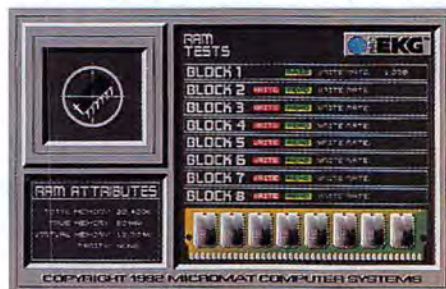
Apple has served up a tempting curveball with System 7. Its advantages fulfill many of the promises that the Mac made in the early days. But there's a funny



One of the greatest factors affecting Mac performance is the video processing. With full-color monitors, there's over 7 million addresses for the processor to track. This 25-step test measures video performance in any monitor setting, even 24-bit color.

spin, and if you use System 7, you know what we mean.

Let MacEKG handle the technical stuff. It quickly learns your system and performs a carload of tests — everything from logic performance, RAM stability, software compatibility, inventory control, video processing, integrated circuit integrity, media verification and overall system health. It analyzes what it finds and provides you with a "dashboard" of your system,



RAM is vitally important to the speed of your applications. Not only does MacEKG check that your RAM works, it checks the rate of its performance — then compares it to previous tests. If your RAM is getting slower over time, you know to replace it before it's too late.

with helpful suggestions on how to improve performance while eliminating the possibility of intermittent system failure.

Unless you're still running a vintage 128K Mac, you need the advanced, automatic diagnostics of MacEKG.

An Examination Of Your Mac's Unique Personality. While there are great products available for many of your system's possible problems, nothing provides you with a concise, complete and understandable view of everything that's going on under the hood. Only MacEKG learns your system inside and out, exploring all possible aspects of your work. MacEKG is the only product available that can tell you if everything is OK.

It can also tell you how to squeeze every bit of performance out of your Mac. For example, did you know that a Mac Plus can outrun a Mac II? It can if the Mac II is loaded with extensions arranged inefficiently. The Mac Plus contains an accelerator and lean system folder. Try it and see...

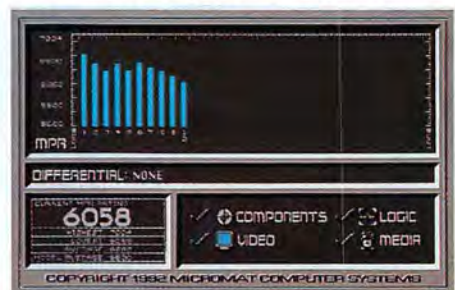
You'll learn how INITs can degrade your system's performance by up to 2% per extension, and if you're running 3 or 4 of them...well, it adds up.

MacEKG knows about performance vs. functionality. It knows the difference between a hardware problem and a software problem. Often, a seemingly unsolvable problem is hidden in some unusual or whiz-bang code in a program, although it shows signs

of being a hardware problem. MacEKG could tell you in a second.

Another great MacEKG feature is its ability to "road test" RAM before you actually unleash it on your system.

MacEKG is like having a highly trained technician on a diskette. Although you won't need to know the



You don't need to be a technician to look at the Histogram and tell if your system is losing performance or not. Each test is summarized in a bar, and the Histogram is like a month-at-a-glance health report for your Mac.

inner workings of your Mac to get the most from it, you'll find yourself becoming a Mac expert in just a few short sessions. MacEKG is a must for the Mac user who wants a trouble-free, high performance system.



For intermittent failures, you need to Reactivator. If continually tests, powers down and retests until the problem surfaces. This is a heaven-sent tool for anyone trying to find heat-related problems.



EKG	
BCC2920 Mac EKG	\$98.90

Bone-crushing Radius Rocket Speed!

REVIEWER'S NOTEBOOK: *Radius has always been on the lips of art directors, designers and studio producers who use Macs. For years, the creative community has turned to Radius to speed their work and enhance their creativity. As an authorized Radius dealer, Tiger presents The Rockets: advanced Motorola 68040 processing power at a new lower price.*

The revolutionary Radius Color Pivot Display is the only monitor that works the way you do — in both portrait and landscape modes. See a full page without scrolling. A spectacular value!

ACCELERATORS: The Rocket 25i provides lightning quick speed for Mac page layout and publishing applications. The Rocket 25i straps on 25MHz processing capabilities and includes floating point instructions. Then there's the Rocket 33 — featuring the fiery rage of Motorola's 33MHz 68040 processor. The Rocket 33 clocks in at over 32% faster than the 25MHz "040" (COMPARE VALUE! The Rocket 33 is 30% faster than the Quadra 700 upgrade and is hundreds of dollars less!) The Rocket 33 is the right board for 3-D modeling, like Pixar's MacRenderman, popular animation applications, publishing and image processing programs and more.

THE RADIUS ROCKET 25i

This is hot new Motorola '040 speed technology at an unbelievably low price. Built to dramatically speed up QuarkXPress, Adobe Illustrator and Microsoft Word. Growing 25MHz '040 processing performance for the Mac II, Ix, Iicx and Ili. At just \$1,395, the Rocket 25i is less than HALF THE PRICE of the Quadra 700 Upgrade (Apple charges you \$3,495 for it — ouch!). One of the industry's hottest boards at a great price. Full support of System 7, NuBus slot design for effortless installation. Great for speeding up RIPs! We were impressed with the software that is included with the Rockets. It allows your system to selectively

enable or disable the '040 cache mode — actually making the Rocket more compatible with existing Macintosh software than the Quadras themselves!

Color Portrait And Landscape Display In One!

The immortal Radius Color Pivot. The only monitor in the world that can display a full page in color and pivot to display a full page landscape too! Ask a pro how much easier that makes his life. Now your Mac can have this freedom, along with resolution up to 640 x 870. And the Color Pivot can provide full 16 color support (4-bit color) from onboard video in the Ili or Ilii — so you don't need an interface card.

The Color Pivot is perfect for design professionals and advanced desktop publishers, but it's also an ideal upgrade for everyday use, especially if you're "in and out" of a variety of applications. Just pivot to see as much of the screen as you need. It's an excellent



radius

value. Consider this — the only other way to see a full page in actual size without scrolling would be to buy a 19" or larger display — many hundreds of dollars more than the Color Pivot!

NEW VIDEOVISION!

High-quality video directly from your Macintosh!

This one amazing board drops a bomb on the Mac market with a new dimension in multimedia. Inte-

grate high-quality Mac audio, video and graphics and output them to videotape, playable on any VCR — with absolutely NO flicker! Compatible with all applications that support QuickTime, so you can also capture digital video information as QuickTime movies or still images.

Introducing the new VideoVision NuBus card from Radius. Its 24-bit technology delivers 16.8 million colors and crisp image resolution. Produce anything from QuickTime slide presentations to sophisticated multimedia presentations with full motion video.

VideoVision supports S-video along with multiple timings and resolutions. Sounds technical, but it means that your video output is compatible with a wide range of Radius, Apple and other computer displays and video formats.

The professional presenter will be born again with the unmatched quality and resolution of the VideoVision NuBus card.

It is a giant leap in multimedia technology.



RADIUS

BCC292i Video Vision	\$2219.00
BCC2780 Rocket 25i (25 MHz no floating point)	\$1395.00
BCC2781 Rocket Accelerator (25 MHz)	\$1859.00
BCC2782 Rocket 33 MHz	\$2299.00
BCC2784A ColorPivot LE	\$925.00

(Please call for details on the interface for your ColorPivot)

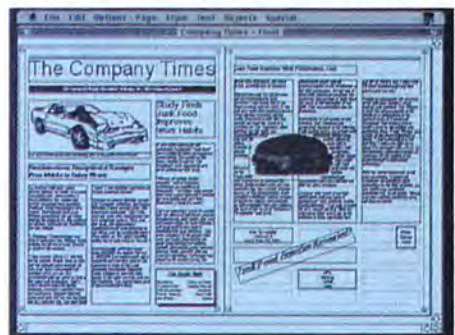
Upgrade Or Switch to Publish-It! Easy 2.1 For Only \$99⁹⁰

REVIEWER'S NOTEBOOK: *If you're about to enter the world of Macintosh desktop publishing, or if you're an experienced user who wants fast, pro-quality results without dredging through hundred-page manuals, Publish-It! Easy is the award-winning, System-7 Savvy product that MacWorld magazine calls "... the Swiss Army Knife of desktop publishers". Now for a limited time, you'll be able to switch or upgrade to this 4-and-a-half mice rated package for only \$99 — if you currently own a desktop publisher or word processing program. This is a \$150 savings off the suggested retail price of \$249.95. Simply send us the title page of the DTP or word processing manual you are currently using, and you'll own Publish-It! Easy Version 2.1 for only \$99. Publish-It! Easy is also available in the new Corporate Network File Server Version.*

The printed page. It can be an adversary or a joy. If you've got new Publish-It! Easy loaded on your

Mac, you'll enjoy the process of laying out a page — and produce handsome newsletters, brochures, catalogs, reports, bulletins, advertisements, flyers, coupons and more! With the toolbox of advanced, easy-to-use features such as The Slide Show (complete with dozens of features and effects, outperforming some stand alone packages!), instant thumbnails (view and edit up to 100 pages), built-in database and mail merge, spell checker and thesaurus, your ideas will look extraordinary on paper as well as on-screen. Draw, paint, edit text, add graphics instantly and use a host of other state-of-the-art publishing tools with sleek controls. In fact, this one program eliminates the need and expense of having separate drawing, painting, word processing mail merge and presentation software — that's how incredibly full featured this package is!

Unique "What-If" Features. And Publish-It! Easy's unique "What-If" design features makes new and exciting layouts come to life with "Libraries" and "Proxies" that take the mystery and legwork out of the design process. Change type styles or sizes and the text automatically reflows. Headlines instantly fit into the area they're supposed to and subheads tuck cleanly into proper position. Indents are done for you, page numbering and book binding margins are automatically added and more. Publish-It! Easy even handles vertical text justification, aligning text with the top, center or bottom — or any way you like it — with just a mouse click. You can quickly import text from your favorite word processor (including Microsoft Word/Works, WordPerfect, MacWrite I and II, WriteNow and others) — with all type styles and fonts intact! Touch-up scanned images with extensive professional tools and import graphics from Adobe Illustrator, MacPaint, Su-



Page layout fast and easy, with a palette of powerful tools. You can easily view double-page spreads.

perPaint, Freehand, FullPaint or any other drawing or painting program with PICT, PICT2, EPS, TIFF or PAINT file formats!

Includes FREE File-It Database... File-It is an incredibly useful database and merge program built right in to Publish-It! Easy. Now you can integrate customized information (names, addresses, phone numbers, personal notes, even entire paragraphs) into form letters you create in Publish-It! Easy.

Corporate Network & CD-ROM Versions Available!

PUBLISH-IT! EASY 2.1

BCC2470 Publish-It! Easy 2.1	
(Try It) Full Retail Special	\$99.90
BCC2712 Publish-It! Easy 2.1 Upgrade	\$99.90
BCC2720 Publish-It! Easy 2.5 Network Pack	
(One Network Filer Server, One-Node Lan Pack, plus another One-Node Lan Pack FREE)	\$299.90
BCC2719 Publish-It! CD	\$149.90

Any Macintosh running System 6.0 or later with 1MB RAM.



Upgrade to 1-2-3: Just \$99⁹⁵! After Wire Transfer Rebate From CheckFree

REVIEWER'S NOTEBOOK: The thoroughbred of Macintosh spreadsheets. Not a step-child of the original DOS product, Lotus 1-2-3 for the Mac has been designed from the ground up to exploit the power and flexibility of the Mac. Revolutionizing financial software with true 3-D worksheet capabilities: Excel doesn't have it, Claris Resolve doesn't have it. Fully featured, with System 7 support, completely customizable with desktop tear-off menus, most functions require just a mouse click. Excel users will be surprised at the power and grace engineered into Lotus 1-2-3 for the Mac. You also get a \$30 rebate on the Live version.

Lotus' deep understanding of advanced spreadsheet and financial modeling technology is present here. True 3-D worksheet management, incredibly nimble relational database power and easy-to-use formulas. Over 14 million people rely on the Lotus concept to create budgets, perform precise forecasting and instant analysis. Proposals and presentations ring with clarity



with Lotus' financial graphs and tables. It's easy to edit cells, create graphs, and import data, using the same menus, tools and file formats across worksheets, graphs and macros.

Using 1-2-3 for the Mac is fast and simple. It embraces new System 7 and provides the classic 1-2-3 menu for complete keystroke compatibility. We love the use of floating toolboxes and palettes, allowing customization of your workspace. Moving around is silky and streamlined, allowing you to quickly select ranges (before or after starting commands). You get in-cell editing and the ability to directly manipulate chart elements. You also get 256 colors, 49 different fill patterns and 230 line styles and thicknesses for use in your spreadsheets.

Along with the brutal power of 3-D worksheets, you can easily customize database forms for automatics fill-in and printing, perform a host of advanced relational capabilities, including swift queries (a particularly useful feature), an ever-active macro recorder (an incredible time saver!), and automatic compression routines for any printer. By the way, Lotus throws in a free copy of Adobe Type Manager.

With 1-2-3 for the Mac, complicated tasks, like consolidations, don't require tedious linking or endless dialog box activity, just a couple of mouse clicks is all it takes. Easily bring remote data right into 1-2-3 through DataLens and the Apple Data Access Language. Read FoxBase and dBASE files directly.

Lotus 1-2-3 for the Mac towers over the capabilities of Excel in a host of areas. Its ability to perform true 3-D functions is an enormous advantage. And the spectacular range of colors and graphic devices available within the worksheet. Excel doesn't allow pop-up functions or range names, Excel doesn't allow you to directly manipulate elements in charts, or perform in-cell editing Lotus 1-2-3 for the Mac does. Excel doesn't include relational capabilities, floating toolboxes or palettes, you can't customize your workspace or have your macro recorder on all the time. 1-2-3 does.

When it comes to spreadsheet features, no one even comes close to 1-2-3 for the Mac. That's because

only Lotus has engineered true 3-D worksheet power into 1-2-3. Excel users are converting in droves to the newest, hottest spreadsheet product, finding features like relational joins and queries, the 1-2-3 Classic menu for 100% keystroke compatibility, vast color and graphics support and a dozen other advantages. In fact, we've compiled a feature-by-feature comparison for your review. But there's an intangible difference: The proven 1-2-3 approach to the worksheet. Just the feel of the in-cell editor, pop-up functions and macros display the refined Lotus functionality. John Sculley, CEO of Apple says "...This is a spectacular product." And MacWeek raves: "The most impressive aspect of the program is its implementation of the Macintosh interface. Mac aficionados will have no problems with the program — 1-2-3 Mac is a Mac application to the core." The numbers have never looked so good...

More Powerful Than A Locomotive. True 3-D worksheet management lets you tackle complex tasks, without complicated linking or dialog boxes. Bring remote data right into Lotus 1-2-3 through DataLens® and the Apple Data Access Language. Then work with it using full relational database power and custom database forms. No matter what you're doing, you'll see only one set of menus, tools and file formats. You'll get so much done with so little to learn.

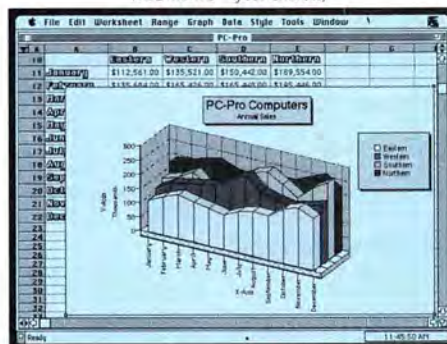
No Mac Is An Island. Share files, macros and applications with Excel users? With PC users? Yes. You heard right. 1-2-3 for Macintosh directly reads and writes Microsoft® Excel for Macintosh files. So you can make the switch to 1-2-3 and never look back. What's more, 1-2-3 for Macintosh is fully compatible with all 1-2-3 files and macros, including PC versions. More than fourteen million people already rely on Lotus 1-2-3 for accounting, budgeting, forecasting, analysis, proposals, presentations and much more.

See How The Newest Macintosh Spreadsheet Stacks Up.

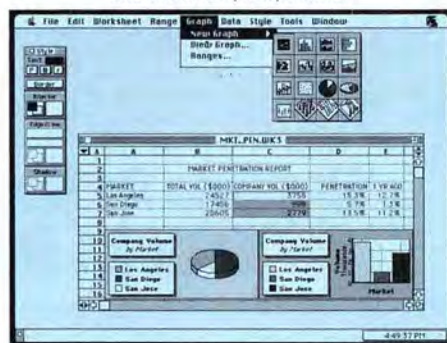
Features	Lotus 1-2-3 for Macintosh	Microsoft Excel 3.0
Optimized for Macintosh		
• Supports system 7 features	Yes	Yes
• Floating toolboxes and palettes for custom workspace	Yes	No
• Directly manipulate chart elements	Yes	No
• In-cell editing	Yes	No
• Context-sensitive, graphical help	Yes	No
• Select ranges before or after starting commands	Yes	No
• Supported colors/fill patterns/line styles and thicknesses	256/49/230	16/18/32
Powerful Spreadsheet Features		
• True 3-D worksheets	Yes	No
• Pop-up functions and range names	Yes	No
• Menu promotion	Yes	No
• Same menus, tools, and file formats across worksheets, graphs, and macros	Yes	No
• Adobe Type Manager included	Yes	No
• Automatic compression on all printers	Yes	No
• Macro recorder always active	Yes	No
• Customizable database forms	Yes	No
• Relational joins and queries	Yes	No
• Directly reads FoxBase and dBASE files (.DBF)	Yes	No
Compatibility		
• Reads and writes all 1-2-3 files	Yes	Yes
• Runs all 1-2-3 macros without translation	Yes	No
• Reads and writes Excel files	Yes	Yes
• 1-2-3 Classic Menu provides keystroke compatibility	Yes	No



"Classic" 1-2-3 menus work the same as the 1-2-3 everyone knows and loves. (Or use the standard Mac menus — your choice.)



Only 1-2-3 has true 3-D Worksheets. Perfect for linking Profit Centers and multiple departments.



Fantastic charting including 2-D and 3-D charts in numerous styles and types — all available with the click of the mouse. And only 1-2-3 has floating toolboxes for ease-of-use.

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ORDER YOUR COMPETITIVE UPGRADE TODAY!

If you are a current 1-2-3 user, you are automatically eligible. If you use Excel, Claris Resolve or another competitive spreadsheet, you too are eligible.

LOTUS 1-2-3 MAC
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You will receive a \$30 rebate electronically from CheckFree.

Draw, Paint, Retouch. Make Digital Movies!

pressive industry awards grace the Illustrator box, a clue to the amazing capabilities you'll discover inside. Indeed, Adobe Illustrator is the most powerful drawing, page design and production tool in the world today.

ADOBE PHOTOSHOP: The ultimate color-retouching/image processing system for the Mac. A great pre-press and production tool, Adobe

Photoshop has garnered loyal users in all areas of graphic design and color reproduction.

ADOBE PREMIERE... Become a movie maker — with the help of your Mac — and new Adobe Premiere. It's the newest creative tool from the leaders in precision graphics and photo manipulation.

REVIEWER'S NOTEBOOK: In addition to the two industry standards reviewed on this page: Adobe Illustrator and Adobe Photoshop, TigerSoftware is proud to be among the first to offer Adobe Premiere, an incredible new title that allows you to combine video footage, audio, animation, still images and graphics to produce digital movies on your Mac. Uses Apple's QuickTime media-integration technology, multi-unit production hardware isn't required. Adobe Premiere is fast and yields high-quality results. Interactive presentations, television ad concepts and roughs, video databases, merchandising sequences and training sessions are just a few of the wide-ranging uses for this new title.

ADOBE ILLUSTRATOR: A slew of im-

POSTSCRIPT FONTS: 40¢

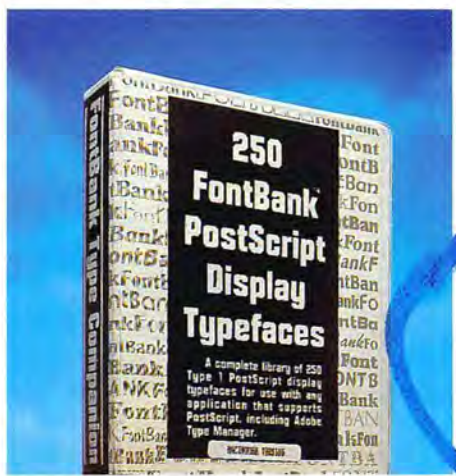
REVIEWER'S NOTEBOOK: What's wrong here? Was that a typo in the headline or has TigerSoftware lost their minds? No typo. No mind loss. Just a great value on a complete (and we mean complete!) library of 250 Type 1 (the best) display faces for use with any application that supports PostScript (including ATM). You already know the value of great looking type in your documents. Now great type costs less. These faces can be used with more than 4,000 Macintosh applications and run beautifully with all Macs. Includes screen fonts as well as printer fonts. Why pay more for foundry-quality type?

Type 1 PostScript fonts — the best you can buy. Smooth and crisp on the screen and on the page. The standard for Macintosh and adopted by Microsoft for Windows. Take advantage of FontBank's staggering array of quality fonts at down-to-earth prices. You'll create attention grabbing documents and eye stabbing graphic elements for any graphics programs and desktop publishers. With such a wide variety of faces available to you, creating incredible headlines is fast, fun and amazingly professional. The headline is the face of good advertisements. Wimpy headlines are usually ignored, while bold headlines attract the reader, and if your message is important, the casual reader becomes curious — and persuaded. Remember, though, that headlines must be legible. If you'd like to know more about working with display faces and creating winning headlines, call TigerSoftware and ask for a free copy of a 24-page book that we've prepared entitled "A Short Course On Working With Type." It has been prepared by the typographers at Tiger and we'd be happy to get one in the mail to you.

FontBank has assembled a vast array of looks and feels in their type library. 250 different faces, each with

its own distinct character. Some you may never have seen before. And FontBank display faces can be easily manipulated with programs like TypeStyler, Adobe Illustrator, Aldus FreeHand and others. Combining FontBank's 250 faces with the capabilities of these programs offers the opportunity for an unlimited number of special effects. And FontBank display faces are compatible with all major page layout applications like Quark XPress, PageMaker, DesignStudio, Multi-Ad Creator and others.

Regardless of what the design assignment, from flyers, posters, ads, coupons and greeting cards, to presentations, notices, memos and packaging, FontBank display typefaces give you the typographic tools you



AUTOMATIC TROUBLESHOOTING! New Help! Finds And Resolves Incompatibilities And Conflicts.

REVIEWER'S NOTEBOOK: Aggravating incompatibilities, raging INIT conflicts, hardware problems, memory shortages and damaged files — they can drive you nuts. Busy Mac users don't have time to wade through stacks of tech notes to find the cure. So...we end up suffering system errors, freezes, printing problems and the occasional crash...

We need Help!...

Help! is a remarkable software program that uses artificial intelligence to track down system problems and provide you with simple instructions on how to quickly resolve them. Help! includes the largest single source of Macintosh problem information available, with built-in knowledge on over 2,800 Macintosh software products.

Contains tons of information on applications, attached hardware, system software, fonts, extensions, system settings, installed memory and more.

Having Help! on your Mac is like having the tech support departments of over 2000 companies — and an Apple engineer — on your desktop. Configure your system for maximum speed and efficiency in just a few minutes. You'll be amazed at how much of your Mac's power is wasted with minor system logjams or files that weren't installed just right. Eliminate memory problems and printing tie-ups. Fix hardware incompatibilities, find damaged files — and see the last of system errors.



Thinking of upgrading to a Quadra? Because of the new 040 processor, a lot of software won't run. The unique "Simulation" feature actually tells you what will and won't run with virtually any new hardware upgrade! Owen Linzmayer, writing in MacUser Magazine said, "This impressive technical-support program belongs in the shirt pocket of every system administrator," and gave Help! a 4 mouse rating.



Help! diagnoses your system for you.

HELP!
BCC2025 Help! \$89.95



Just a sample of the FontBank library of pro-quality Type 1 typefaces. Each is smooth and clean on-screen — and on paper!

need to look your creative best. And, when converted to editable outlines using FontMonger, these faces can be used to produce special text and design effects to create stunning documents.

How long have you been using those same tired typefaces? Chances are, you use what you have because finding the right typefaces, installing them, and learning to use them is more trouble than it's worth. So, you compromise the overall look of your document by compromising on the one critical factor: the type. That's why FontBank is such an exciting product, easy to install, a pleasure to use — and a low cost way to improve the quality of everything you print.

FREE DESIGNING WITH TYPE BOOK

FONTBANK
BCC2425 FontBank \$89.95
Can be used with any Macintosh.

Keep Schedules in Sync with Mac's Best Calendar

REVIEWER'S NOTEBOOK: Computerized calendars have been with us for a long time (they're a natural for any computer), and I've seen more than I can count. So when one comes around that's really heads and shoulders above the rest, it's something to get excited about. It started out as a project at Claris Corp., moved on its own to Now Software (makers of the popular Now Utilities), and finally culminates in Now Up-to-Date — the only calendar that keeps your appointments and your associates up-to-date, in the office, at home, or on the road.

Now Up-to-Date reminds me of important appointments (even when the application is off and I'm only running my spreadsheet). It shows me daily, weekly, monthly and yearly views that make visual sense. It even lets me take my PowerBook on the road and make schedule changes for both myself and my associates, and when I return to the office, it automatically updates both my personal and the centralized Public calendars — that's smart.

The goal was to combine the timeless functionality of the appointment calendar with the power of the Mac. To take the age-old appointment/calendar book, which people instinctively know how to use, and place it on the screen, infused with powerful capabilities that simplify as well as automate. That's a relatively easy task when talking about power and new features — practically any professional programmer can do that. The hard part is to make it really useable. To make it easy enough and intuitive enough for a novice to sit down and really use it. After all, who wants to have

more attention on keeping their schedule than absolutely necessary?

That was the star high goal, and it's our privilege to announce the goal's finally been reached. Introducing Now Up-to-Date, the premier calendar tool that's both powerful enough to fully schedule any individual or group, plus straightforward enough to be easy-to-use and intuitive for every user.

From the unique "Public Calendars" that coordinate your schedule with your associates' schedules automatically, to the powerful "Reminder" feature that notifies everyone about a meeting far enough in advance to ensure everyone shows up on time, Now Up-to-Date is one-of-a-kind software you can't do without. Check out what Now Up-to-Date can do for you...

Even with the new PowerBooks, there are still times when the old-fashioned, printed appointment-book (on which Now Up-to-Date is based) best serves the purpose. That's when you'll love the printing options with all the popular appointment book formats like DayTimer, DayRunner, Franklin Planner and FiloFax. Plus you can print your calendar in a variety of other formats.

Customize Your Calendar. Now Up-to-Date's flexible Views and Styles let you customize your calendars, so you can see and edit them any way you want.

- View a day, multiple days, a week, multiple weeks, a month, multiple months, or a year at-a-glance
- Edit any event in any view
- Draw extra attention to big or important events with Electronic Sticky Notes and colorful Banners
- Control how many hours are displayed per day
- Create (and easily switch among) multiple style groups
- Display multiple views of the same calendar at the same time



Organize Your Appointments. Now Up-to-Date's unique 'Public Calendars' coordinate your schedule with your associates' automatically, so your left hand can know what your right hand is doing.

- Combine related calendars into custom groups (create a Social Calendar by 'subscribing' to the Holidays, Parties, Birthdays, and Vacation calendars)
- Filter out information you're not interested in
- Assign different colors and text styles to events from different calendars to make them more identifiable
- Run the Public Calendars server unobtrusively in the background on any non-dedicated Macintosh on your network
- Import events from other calendars, personal information managers, or any other source of tab-delimited text

NOW UP-TO-DATE

BCC2108A Now Up-to-Date	\$65.95
BCC2108B Now Up-to-Date 5 User	\$265.95
BCC2108C Now Up-to-Date 10 User	\$395.95

The Informative, Intuitive Mapping Software.

REVIEWER'S NOTEBOOK: How many years have you been looking at your business in rows and columns? And realizing that it just isn't laid out that way? Twenty minutes with GeoQuery will change all that. Providing you with a new, and much better view.

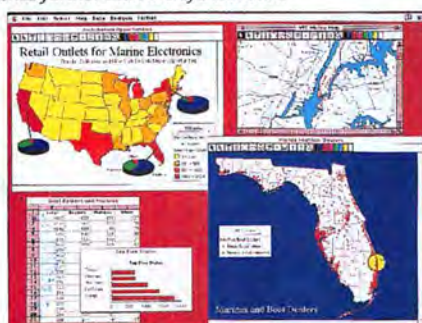
GeoQuery instantly transforms your customer and prospect lists — or any business data — into interactive maps. It lets you do things that are impossible with your spreadsheet, database, or contact manager. Things like making that extra sales call you would oth-



"GeoQuery's maps make it easy to spot the best places for growth."

erwise miss, choosing the best location for a seminar or service center, and assigning optimal sales territories. Making your presentations clear and compelling.

GeoQuery is the only software that lets you do these things quickly, easily and affordably. It's the perfect get-it-done tool for anyone whose business extends further than the eye can see...



"Includes maps for US, Alaska and Hawaii with Interstate Highways and all 43,000+ ZIP code locations. High resolution maps with county boundaries are also included for the 11 largest metro areas."

Map Mountains Of Data. GeoQuery knows the location of every 5-digit ZIP code in the US — all 43,301 of them. So in the blink of an eye, your customer lists, prospects, corporate facilities, any ZIP-coded data, are magically pinpointed on GeoQuery's built-in maps.

But GeoQuery shows you a lot more than just your business sites. It lets you see how your data relates to each other. Sales territories to customers. Prospects to dealers. Service personnel to equipment installations. Not to mention the Interstate Highways, over a thousand cities, and extensive census data — all included in the basic package. You'll gain new insights on ways to service accounts better. Reduce travel time and costs. And spot the opportunities for growth that others are missing.

Know Where You're Going. How many times have you driven hundreds of miles, and made only one call? How many accounts did you drive past on the way? How would you know? Well, those days are over.

Team up GeoQuery with your contact manager or prospect database and a quick glance at the map will tell you who's next door. Or choose the Find Pins command and GeoQuery will instantly identify your closest account. You will make more calls in less time, sell more, and maybe get home a little earlier on Friday.

Sell Your Ideas. Maps are powerful tools to present and sell your ideas. Whether it's showing a client why you can service their accounts better, explaining that redistricting plan to the board of directors, or just reviewing sales results at the monthly meeting, GeoQuery's maps will help you present your results and sell your ideas. Quickly and effectively.

Free with purchase of GeoQuery:

DYNODEX A perfect place to organize your names and addresses. A \$129 VALUE

GEOQUERY

BCC2106 GeoQuery w/Dynodex	\$395.00
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Gut-Wrenching WW II Airborne Action! You And Your B-17 Crew Fly A Pre-Dawn Raid On Nazi Germany...

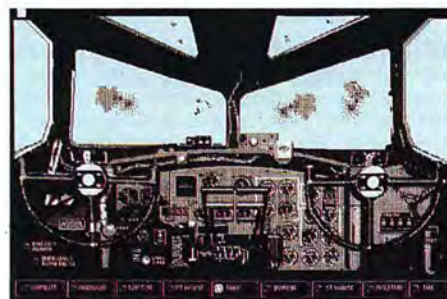
REVIEWER'S NOTEBOOK: Two Rene Vidmer classics, recreating the great air clashes in the history of warfare. Bomber is not a wimpy flight simulator or silly arcade slugfest, it is an intensely realistic action-adventure that takes you and a young B-17 crew on 25 missions over Nazi-occupied Europe. Your plane, a seasoned Flying Fortress and your ten man crew communicate during one of the most vicious campaigns of the war. Great animated sequences keep you in the heat of the action, as you descend on a Magdeburg oil field.

The Battle of Britain is the historically accurate situational game of strategic skill and military instinct. The year is 1940, over the skies of Britain, the relentless Nazi air assault continues. You track incoming

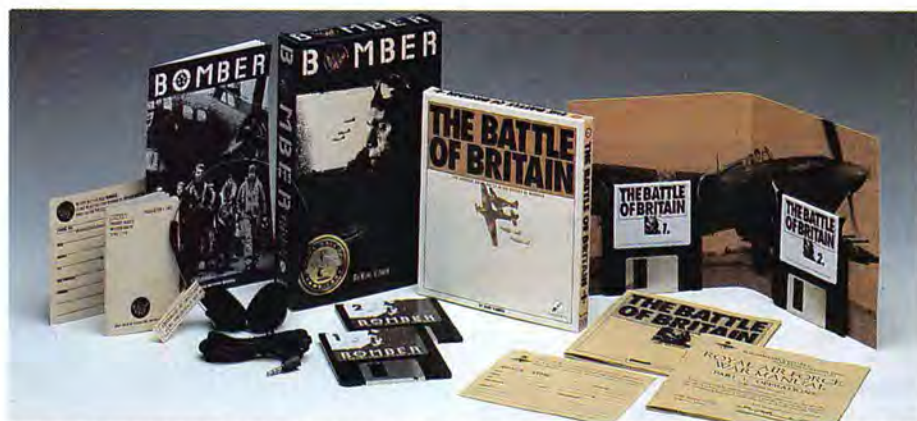
raids using radar screens and ground observer reports. You evaluate your resource of men and machines to carefully plan your missions. It's you versus the uncanny ability of the German Luftwaffe — are you ready at any moment to scramble pilots to their mighty Hurricanes or legendary Spitfires?

Historically accurate recreation of the two greatest air battles in the history of warfare. Employs the identical plotting map actually used by RAF Fighter Command in the summer of 1940 to track incoming raids; and the identical tote-board system to quickly vector the precious few Hurricane and Spitfire Squadrons to intercept those raids. The player will have his hands full tracking Radar and Ground Observer reports, analyzing the size and potential threat of "UNIDENTIFIED CIRCRAFT 2000+ SPOTTED VICINITY BIGGEN

HILL...", interpreting the daily 'Ultra' intercepts, and coping with the weather, dwindling resources, and the Luftwaffe's sometimes uncanny ability to outfox you at every turn. By 'Bomber' author, Rene Vidmer.



Just you, a 10-man crew, and a Flying Fortress named "Naked Lady."



DEADLY GAMES

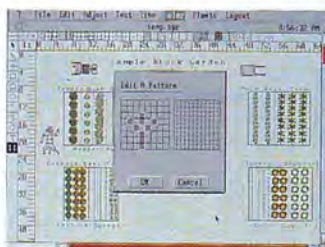
BCC2870 Battle of Britain 2.1 (Color) \$35.95
BCC2871 Bomber 2.2.5
(With Headphones) \$32.95

Design Your Vegetable Garden On Your PC.

REVIEWER'S NOTEBOOK: The modern gardener's way to plan a vegetable garden! A great idea, crafted beautifully into a wonderful piece of software. Sprout! combines the power of your Mac with advanced gardening techniques to produce great vegetable garden plans.

A planting tool organizes your garden's layout, change scales to see your garden in different views, add vegetables to the existing database and create your own custom design and figure in your climate (7 regions are provided).

SPROUT! is a complete planning



tool for vegetable gardeners. Its unique planting tool produces a graphic, scalable garden plan with correct plant and row spacing.

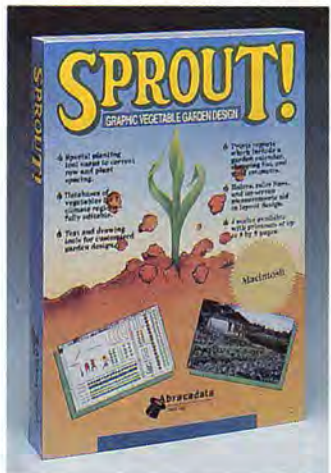
In addition, SPROUT! contains a full editable database of vegetables for 7 climate regions which includes: planting and harvesting times, yield, soil pH, seed requirements, plant and row spacing, cool versus warm climate seasons, growing tips, and other information.

Create vegetable symbols and customized your own garden designs with text, drawing and editing tools. Design layouts in four scales with drawings up to 8x8 pages large. Prints out garden layouts, calendars, shopping lists, and reports.

- Special planting tools snaps to correct row and plant spacing
- Ruler, Ruler lines, and on-screen measurements aid in layout design.

SPROUT!

BCC2107 SPROUT! \$59.95
Any Macintosh with minimum of 1MB, mouse, hard drive, and printer.



Design Your Dream House on Your Mac.

Go ahead — design that new addition to your home! Put your imagination to work on the interior, then plan the perfect landscape. Experiment with different layouts, colors, shapes and ar-

signer home right on your Mac. Instantly draw floorplans, building side views and structural details. Rearrange your ideas, add notes and labels. Design Your Own Home automatically calculates distances, areas and angles, and uses all appropriate standard architectural scales.

INTERIORS. Bring your own unique interior design ideas to life with Design Your Own Home Interiors. This remarkable system is easy-

to-use yet extremely powerful. Arrange furnishings and they're automatically kept to scale!

LANDSCAPE. Ask any real estate professional, they'll tell you that landscaping can significantly increase the value of your home. In any given neighborhood, two identical homes may sell for many thousands of dollars difference — simply because of the care

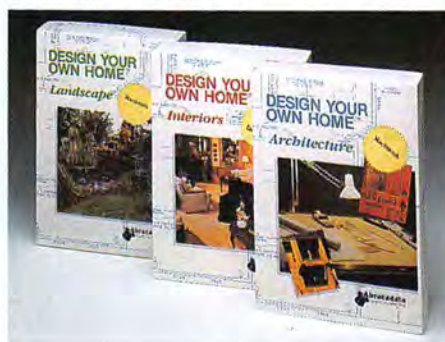
taken to enhance the look of the property. It allows fast, easy planning with a variety of useful tools.

TIGER SPECIAL VALUE

BUY ALL 3 — SAVE \$3500!

DESIGN YOUR OWN HOME

BCC2001 Architecture \$59.00
BCC2002 Interiors \$59.00
BCC2003 Landscape \$59.00
BCC2004 All 3 Titles \$159.95
Any Macintosh with 1MB, Mouse, and LaserWriter



rangements with the Design Your Own Home Series. It's fast, easy and fun — the results are clean, precise and professional. It's your home, who could design it better than you?

These three simple-to-use computer aided design systems include a dozen of sample floorplans, pre-drawn furnishings, plants, flowers, trees and shrubs. You can modify plans to suit your taste, or start from scratch to create just the environment you've been dreaming of.

ARCHITECTURE. You can create a de-

The Finest Removable Hard Drives Made.

Tiger Presents The PLI 44Mb And 88Mb Cartridge Drives

REVIEWER'S NOTEBOOK: Highly acclaimed, 100% reliable and backed by a solid warranty, the PLI line of removable cartridge drives is the most respected in the industry. When your files and applications grow to monumental size, when you want to perform fast backups or when you want to take heavy megabytes on the road — there're the PLI Infinity 44 and 88mb drives. The PLI Cartridges carry a full 5-year warranty. One other note: The PLI drives and cartridges are thoroughly tested, far exceeding industry standards.

With much of the design and layout work done at TigerSoftware on Macs, our PLI cartridge drives are critical to a smooth operation. Without their reliable service and unmatched speed, getting our hands on files would be nearly impossible. Our choice: the PLI Infinity 88 Turbo drive. This remarkable instrument carries a 60,000 hour MTBF (Mean Time Between Failure) rating. That's over 6 years between down time! It features the highest level of filtration,

quality-engineered circuitry and is virtually impossible to damage by incorrect cartridge insertion (a leading cause of drive failure).

Designed and engineered for rugged use, the PLI Infinity 88 Turbo has the industry's highest tolerance to non-operating shock (our 88 Turbo once survived a four-foot fall onto a tile floor).

Of course, you'll get all the features that have made PLI the name asked for most when it comes to removable cartridge drives including external switches for termination and SCSI address, UL-approved, individually tested power supplies, long-life 50-pin Centronics SCSI connectors, an external fuse and (unlike other drives) you get the complete kit, with all necessary cables and accessories. The Infinity 88 Turbo beats Bernoulli hands down when it comes to price, performance and value.

NEW PLI "FLOPTICAL"

The Infinity Floptical. It's the way to make sure backups get done. If you know how to use floppies, you already know how to use the Infinity Floptical. Backups are fast and reliable. You do not have to restore data to use it. The backup files are instantly accessible.

Convenient & Secure Data Sharing. To transfer large files or volumes between computer systems with Infin-



PRICES DRAMATICALLY SLASHED!
ON THE BEST DRIVES IN THE BUSINESS...

ity Floptical drives, just remove the disk from one and insert it in another. Each Floptical diskette holds the equivalent of 14 HD 1.44MB diskettes.

Unlimited Storage. The Infinity Floptical frees you from the capacity limits of fixed hard disks. You get infinite storage capability simply by inserting additional diskettes. They cost only slightly more per megabyte than standard diskettes, and are just as easy to use.

PLI Reliability, Service and Support. After more than six years of bringing innovative SCSI storage solutions to personal computer users, PLI has become the most trusted name in SCSI storage solutions.

PLI DRIVES & CARTRIDGES

BCC2460B Infinity Removable 44mb	\$599.00
BCC2460A Infinity Removable 88mb	\$799.00
BCC2465A 88mb Uniform Cartridge	\$139.00
BCC2465B 44mb Uniform Cartridge	\$99.00
BCC2465C 88mb Format Cartridge	\$159.00
BCC2465D 44mb Format Cartridge	\$89.00
BCC2899 Infinity Floptical 21mb Ext.	\$479.00
BCC2899A Infinity Floptical 21mb Media	\$49.00



Quality Memory — at Just a Fraction of the Price You'd Pay for Apple Memory!

REVIEWER'S NOTEBOOK: Here at Tiger we love our Mac LC and II computers, but we kept getting "The application could not be opened" and "Application has unexpectedly quit" messages. We found out that the amount of memory they came with from Apple just wasn't enough for the newer applications. So we called Apple and priced out more memory. Wow! We were in shock! \$995 for 4MB of memory! We knew something wasn't right. So we looked for a better way.

Who Needs It? Desktop publishing, high-end graphics, animation, CAD, modeling, and a multitude of other applications demand more memory. Quark cries for at least 8MB (MegaBytes). PhotoShop wants to put up "Out of Business" signs unless it gets 4MB. System 7 demands 2MB all for itself, then you must have some more for your applications. And if those applications don't get what they want, they can be pretty tough characters to work with.

When you try to run an application but don't have enough memory, two problems may occur. If you are really short on memory, the application may simply refuse to launch. The Mac will display a dialog box that says "The application could not be opened." Worse, it may let you open the document but later quit in the middle of the session displaying "Application has unexpectedly quit." Usually you get a warning before you launch telling how much RAM you ought to have versus how much is actually available. If the amount is 75% of the total normally required, you are probably risking an "Unexpected Quit." All of your most recent changes since the last Save will be lost. Ever notice the colors reverse on your screen? That's the way some applications warn you of low memory.

Printers Need Memory Too... LaserWriters use mem-



ory to store fonts and prepare graphics for imaging. Ever been stopped from printing a page with several different fonts or perhaps a large graphic image? Then you need more memory. Adding memory to a LaserWriter increases the space so you can print with more fonts, bigger graphics, and faster printing in many cases.

Z-COM designs, assembles, tests, and packages their memory upgrade products. With a multi-million-dollar assembly facility, including a Class-100,000 Clean Room, all Z-COM products are manufactured using the highest quality equipment under the tightest tolerances and the strictest controls. Everything is double checked, from board tolerance and thickness, to the consistency of the solder paste. Z-COM controls the manufacturing process from the moment the ICs arrive at their facility, through the manufacturing process, up to the final packaging.

FREE BOOK & DISKETTE!

What is memory and why do you want more of it? Order now and get "The Macintosh Memory Guide" from Connectix absolutely free. A simple explanation of memory and how to get the most out of your Macin-

tosh. Packed with tips on making your Mac faster; best explanation of 32-bit addressing mysteries. Includes HyperCard stack on diskette for easy reference. A complete memory guide — FREE! Picks up where your Apple Users Guide left off.

For example: Did you know that RAM is actually a place to temporarily store your data and applications? When you turn off the power — they're gone. Your hard drive or diskette is where you permanently store your files. That's what happens when you "Save" your file. The file is transferred from RAM to the hard drive or diskette.

Are you confused with Apple's explanation of 32-bit addressing and virtual memory? This entry-level guide to high-tech secrets gives you all the facts — in a way that make sense! It's easy and, best of all, FREE! Call Tiger today and let one of our friendly reps help you pack your Mac with lightning fast power.



Z-COM

BCC2835 1MB for SE30, II, IIfx, IIfx, IIsi	\$59.00
BCC2836 2MB for Plus, SE, LC	\$95.00
BCC2837 4MB for IIfx, IIsi	\$185.00
BCC2838 16MB for IIfx, IIsi, IIfx, IIfx	\$655.00
BCC2839 4MB for IIfx	\$180.00
BCC2840 16MB for IIfx	\$655.00
BCC2841 4MB for LC	\$180.00
BCC2842 8MB for LC	\$339.00
BCC2843 2MB for PowerBook 100, 140, 170	\$135.00
BCC2844 4MB for PowerBook 140, 170	\$259.00
BCC2845 6MB for PowerBook 140, 170	\$359.00
BCC2846 1MBx8 SIMM Modules 80 ns	\$39.00
BCC2847 2MBx8 SIMM Modules 80 ns	\$75.00
BCC2848 4MBx8 SIMM Modules 80 ns	\$129.00

SIMM Modules have a 5-year warranty; all other memory has lifetime warranty. 60ns, 80ns and 100ns RAM also available.

The 400 DPI, PostScript Level 2, Risc-Based Laser Printer That You Can Afford!

REVIEWER'S NOTEBOOK: *If we had room for a larger headline, we would have also told you that the Generation Systems 415 Laser Printer has 4Mb of memory, 35 resident fonts and can print 8.5"x11" and 11"x17" pages — up to 15 of them per minute! The reproduction quality is amazing: crisp images, consistent blacks and reliable performance for any job.*

The fact is, this is a great laser printer that is priced to absolutely fly! Compare the Generation Systems 415 vs. lasers from ATI, DEC, LaserMaster, QMS and Fujitsu. The Generation Systems 415 has a SCSI port, so you can easily plug in any standard SCSI hard disk to download fonts, images, logos, your letterhead and more, making it a great network printer. By the way, there's also parallel, serial and AppleTalk ports so you can plug in PCs, Macs and other types of computers and have them all running jobs to the printer at the same time!

Sure, we were skeptical when the crate arrived. Inside, we were told, was a fire-breathing laser printer that could turn the industry on its ear. With RISC (Reduced Instructional Set Computing) and PostScript Level 2, you'll see unparalleled speed. PostScript Level 2 offers enhanced capabilities and great output.



And as PostScript Level 2 continues to develop, you'll see innovations like file compression/decompression, advanced caching, memory management technology and more.

With ultra-fine 400 dpi resolution, the Generation Systems 415 breaks the 300 dpi barrier, offering sharper, richer grayscale images. Compare: a 300 dpi printer lays down 90,000 dots per square inch — 400 dpi delivers shattering realism with 160,000 dots per square inch! It is the ideal machine for word processing, desktop publishing, large spreadsheets — and just about any printing task. Even small type prints with incredible clarity.

GENERATION SYSTEMS

BCC2906 415 Laser Printers . \$4999.00

The 32-Bit, 16.8 Million-Color Paint Program That Costs Just \$29.95!

REVIEWER'S NOTEBOOK:

It's hard to imagine that a paint program with true 32-bit color and a palette of 16.8 million colors, plus an extensive toolbox of creative features can sell for just \$27.95. But a few minutes with Expert Color Paint and you'll know that it's true. Expert Color Paint brings professional-quality paint and photo preparation down to earth with one of the most feature-rich, easy-to-use products we've ever seen. This one is fast, fun and loaded with all the extras — including System 7 support.



great looking images, just like the pricey packages, and adds a studio-full of advanced toolbox features, such as lasso and magic wand, gradient tools, dropper, air brush, paint can, patterns and more. For image editing, there's blur and sharpen, distort, skew, brightness filters, contrast control, image scaling, paint dithering, antialiasing (smoothing), rotate, flip, stretch and slant.

EXPERT COLOR PAINT

BCC2505 Expert Color Paint . . \$29.95
Requires Macintosh SE/30, LC, Macintosh II, IIfx, IIfx, Classic II, PowerBook 140, PowerBook 170, and Quadra families (68020 processor or above) with 2 MB RAM and a hard disk; System 6.0.5 or later and 32-bit QuickDraw; 8-bit video card recommended.

Two "Must Have" Mac Utilities.

REVIEWER'S NOTEBOOK:

Here's two additions to any Mac you'll use everyday: a file browser that quickly lets you view any file, even when you don't have the original application, and a super calculator that's a must for every desktop publisher.

CanOpener

MacUser Magazine called it "A Must-Have Utility". It's the ultimate file browser and text searcher we've ever seen. You can search an entire folder for any occurrence of text.



You can view the contents of any file, including application files. You can even extract pictures of icons and tools from application files! Who needs the original application? You can quickly look at the contents of virtually any file — text, pictures, sounds, whatever — and copy

them to the Clipboard or to a new file.

Calc+

Quick. What's 6 picas 9 points + 10 picas 9.25 points? With the fantastic Calc+ you'd instantly know it's 17 picas 6.25 points. And then with one click you'd know that's 2.92 inches, or 7.417 centimeters, or you could convert to the European standard of ciceros. Instantly and always available at your fingertips. Scroll up and down the paper tape, zoom full-size, copy just one line or all lines to the Clipboard. All this and more from this ingenious, easy to use calculator. Calc+ is a must for anyone doing page layout, graphics or desktop publishing.

ABBOT

BCC2907 Calc+ \$39.00
BCC2908 Can Opener 2.0 \$59.00

When Your List Of Things To-Do Gets Too Big To Keep In Your Head.

REVIEWER'S NOTEBOOK: *The remarkable thing about In Control is its uncanny ability to do things the way you want. To organize its functionality the way you work and get going right out of the box.*

In Control combines the flexibility of an outline with the power of a row—and—column format to handle even the most eventful business lives. It's like having a spreadsheet and outliner in one, both ready to perform. That's the secret, the ability to present information as a table or as an outline, depending on the task, or the way you work — and the way you think.

Indent, collapse, or expand your view of events, people and possibilities and categorize your information by person, project or due date. Click and drag to create to-do lists. Extremely efficient.

So the big advantage for you is the ability to track the details without losing sight of the big picture. Set priorities, sort your to-do's in any order, and focus on what's more important and more profitable. Keep track of deadlines, assignments, progress and print reports, agendas and action items. Manage client and customer relationships and more. Another great feature: customizable data entry. Also ideally suited for mobile computing; In Control keeps your information handy on the road, and it has low memory requirements.

A better way to perform a familiar function.

WHATEVER YOU DO...

In Control is perfect for managers in any situation. Production managers, people managers, sales and marketing managers. It's great for making lists, outlining your writing and of course, managing your personal information.

Production managers are able to keep track of the every detail involved in a project and keep them coordinated within the larger plan. Complete status reporting means every report is up-to-the-minute. In Control is the only tool that can do it...

People managers can keep track of deadlines, assignments, progress and resources. Focus workers on the tasks suited to their talents to produce efficient work flow. Sales and marketing managers can easily manage their relationships with customers and keep all of their important customer information in one place.



IN CONTROL

BCC2700 In Control \$89.95

RUN DOS-PC SOFTWARE ON YOUR MAC!

REVIEWER'S NOTEBOOK: At last! The great barrier between Mac and DOS compatibility has been removed — for good. As a user of both Mac and DOS computers, I know the pros and cons. Macs are friendly and advanced, but the DOS world has more people creating more software. Specialized software that might fill your particular needs. Plus today's office environment uses a mix of DOS and Mac computers, which plays havoc with spreadsheet and data files needing to flow smoothly between Mac and DOS PCs. That's why we at Tiger are proud to offer the world's best-selling answer from Insignia Solutions, a dedicated company who has had a five-year mission: To bridge the compatibility problem between different worlds of software. They're the best. They have a solution to fit every need and every Mac. Best of all — it's software only! No expensive hardware to buy or install.

Here's a suite of solutions that solves forever the problem of Mac & DOS incompatibility. Need to use a co-worker's DOS floppy with their DOS 1-2-3 file on your Mac? No problem. Simply slip it in and watch as that DOS floppy appears just like any Mac floppy — complete with icons and folders. Amazing! But that's not all. Double-click on that DOS 1-2-3 file and stare in amazement as 1-2-3 Mac or Excel starts up automatically and loads that DOS file! You can make changes, save it, give it back to your DOS-using co-worker, and then chuckle as he loads the file with your changes — like nothing unusual happened. But that's only the beginning of these incredible solutions...

Turn any Mac into a DOS PC. Run actual DOS applications: 1-2-3, ProComm Plus, dBase — virtually any DOS application — from inside a Mac window. Cut & Paste between Mac and DOS windows. Save, copy and print right from your DOS application. Run your favor-



The ultimate Mac-DOS connection. Run any DOS program or any MAC! Fast and fully capable — even run DOS communication software.

ite DOS application just like it was running on any DOS 286 PC. You can have the best of both worlds: the fast, easy Mac interface you've come to know, and a huge world of specialized DOS software that fits every known need.

AccessPC. Slip a DOS floppy into your Mac and it looks just like a Mac floppy! An icon appears, you double-click it and DOS files and sub-directories appear just like the were Mac files and folders. Double-click on the DOS files and immediately run Mac applications like Word, 1-2-3 Mac and Excel. AccessPC is still the fastest — fully 4 to 10 times faster than the competition!

Now with Cartridge and Magneto-Optical Drive Support!

AccessPC is instantly compatible with your external cartridge and magneto-optical drives. No other utility software is needed! (Unlike the others that make you call your drive manufacturer for software they haven't even finished yet.) Your DOS files are ready, will



ing and able with the finest DOS file access application made — AccessPC.

Added bonus! Intelligent disk cache for your cartridge and magneto-optical drives can increase performance by 30% or more — and it's free!

SoftPC Family. Turn any Mac into an advanced DOS computer! Run virtually any DOS application from within a Mac window, complete with all the extras. SoftPC will turn any Mac into a 286 AT computer, complete with a full 640 K of memory and DOS 3.3.

Run a DOS program and print directly to any Mac printer — just like it was an industry-standard Epson LQ2500 (which virtually all DOS programs support). Or if the DOS program supports Postscript printers, you can print directly to any LaserWriter or other Mac PostScript printer. TrueType fonts are even included for the Epson LQ2500 so you get crisp, clean printouts every time.

Getting data between DOS and Mac has never been easier. Cut & Paste with the Mac Clipboard between all DOS and Mac windows.

Put DOS files and applications on any Mac drive — any folder or volume that appears on your desktop can be used, even remote hard disks on networked Macs.

What I love best about SoftPC is that all the extras have been thought of and included. Like turning your Mac mouse into a Microsoft DOS Mouse so you have complete mouse support in your DOS programs. The one mouse in the palm of your hand works in both DOS and Mac windows. Even DOS communication software works on a Mac. The Mac Printer and Modem ports are used as DOS COM1 and COM2 ports. Every DOS program I've ever heard of works perfectly on a Mac. From CD readers to Novell networks — it's all here — and it's very easy to use.

There are three members of the SoftPC family, each designed to take advantage of the wide range of different Macs:

Entry Level SoftPC. This member of the SoftPC family was designed for low-cost Macs including the Mac Plus, SE, LC, Classic and Portable. You get everything mentioned above including IBM AT 286 emulation, DOS 3.3 and CGA graphics.

Universal SoftPC. Step up to Universal SoftPC and you add several new capabilities to the Entry Level SoftPC package. CD-ROM support lets your Mac CD reader play DOS CDs. And if you purchase the optional SoftNode add-on, you can access Novell Netware networks. It's the perfect solution for offices with specialized Novell software.

SoftAT. Fasten your seatbelt and hang on as SoftAT takes DOS software to new levels of high-performance. You need a Mac LC, SE30, Mac II, si, ci, cx, fx, Quadra or PowerBook 140 or 170 to run it, but it's all speed. You get lightning-fast benefits like a Math Co-processor, EGA graphics for more demanding graphics applications, and Expanded memory for big, hungry applications. SoftPC is the ultimate answer to Mac and DOS compatibility.

SoftNode. Another Insignia Solutions breakthrough is SoftNode — the perfect solution for running Novell Netware PC client software on any Mac. With the addition of the SoftNode add-on, both Universal SoftPC and SoftAT can run off-the-shelf and customized MS-DOS programs on any Mac. Now you can build on your existing PC LAN hardware and software investment and fully integrate Macs into PC workgroups. Call for your Free PC Catalog.

TIGER EXCLUSIVE BUNDLE

Your Choice of Insignia Product And FREE FormTool, Personal Lawyer, Lotus Agenda

INSIGNIA

BCC2915 AccessPC Bundle.....	\$79.90
BCC2916 Entry Level SoftPC Bundle.....	\$149.90
BCC2917A Universal SoftPC Bundle.....	\$219.90
BCC2917B Universal SoftPC Bundle 10 Pk.....	\$1465.90
BCC2918A SoftAT Bundle.....	\$335.90
BCC2918B SoftAT Bundle 10 Pk.....	\$2335.90
BCC2919A SoftNode Bundle.....	\$125.90
BCC2919B SoftNode Bundle 10 Pk.....	\$740.90

Create Your Own Multimedia Production!

REVIEWER'S NOTEBOOK: Turns your Mac into a complete audio workshop! Fast, and easy — not to mention a carload of fun! Record, edit and play back live or recorded sound to add enormous impact to multimedia presentations, training materials and documents with voices, music and sound effects. Nothing smacks an audience like great sound — it keeps them right there!

The MacRecorder Sound System Pro digitizer features a built-in microphone, external microphone jack, line input jack and input level control for simple, centralized recording. Just plug the digitizer into your Mac's printer or modem port, open the mic and start recording! The software included, called SoundEdit Pro, acts as your mixing board to create soundtracks, voice-over narrations and great sound effects. Record directly to disk — then play back right from the disk. The sound appears on your screen as a waveform for easy editing. Cut and paste sound clips (just like cutting and pasting text) and modify sounds with a host of creative tools to create intriguing effects. Run sounds backwards, add echo, reverb, bender,

envelope, loop-back, tempo and filtering. Mix multiple tracks of music, sound effects, and voices to produce pro-quality, multi-track soundtracks for your presentations.

SoundEdit Pro also allows you to open and save 8 and 16-bit samples at rates up to 48kHz.

MacRecorder Sound System Pro does not require technical knowledge of sound engineering. The fact is, you can achieve professional results the first time out. Just click to record, edit and mix. Record voices with the built-in microphone and put that voice anywhere by just moving it like you move text or graphics.

You can use MacRecorder Sound System Pro with a variety of software, including MacroMind Director, MacroMind MediaMaker, MacroMind Paracomp Magic, QuickPICS, HyperCard, QuickMail, Microsoft Mail or any program that supports Macintosh Sound Input Manager. It also supports SuperMac's Video-Spigit. MacRecorder Sound System Pro gives sound in-

put capabilities to Macintosh II, IIcx, IIci, IIx and IIfx.

MacRecorder Sound System Pro includes the MacRecorder digitizer, SoundEdit Pro, HyperSound and HyperSound Toolkit, audio cable and MacRecorder Driver.



Built-in microphone jack, external microphone jack, line-in jack, and input level controls, for simple centralized recording.

MACROMEDIA

BCC2912 MacRecorder Sound System Pro Bundle \$275.90
Call for system requirements.

Create Full 3-D, Photorealistic Images!

REVIEWER'S NOTEBOOK: MacRenderMan represents the finest software available for 3-D image creation. It is perfect for those who are new to 3-D and for those who have experience with modeling software. Showplace-MacRenderMan gives you an easy way to improve images created with RenderMan compatible modeling applications or to create a dazzling 3-D image using the pre-designed shapes that come with Showplace. With Showplace you just arrange your scene, select realistic appearances for your objects, set your lights and watch the powerful MacRenderMan create your image. Pixar's RenderMan technology was used in the academy award winning film *Tin Toy* and to create special effects in films such as *The Abyss* and *Terminator 2*. Showplace-MacRenderMan gives you access to this amazing technology and you can see impressive results in a short time, but if you get the urge, you can get crazy with these products and never be seen or heard from again...

MacRenderMan. Fascinating photorealistic design made easy (and fun). Three distinct dimensions in full color, with a variety of surface textures and designs. In our first session, we created several billiard balls with a variety of whacked-out designs and colors in under an hour. That hour passed quickly; the real work was handled by MacRenderMan transparently.

We began the modeling process by describing the objects (geometry and appearance), the characteristics of the lighting (the light sources) and the view we wanted of the object (the camera, if you will). We then



Give images 3-D beauty and realism. You'll see vivid colors and rich detail.

had a scene! We could change the texture of the surface (and how the light reflects off of it) and easily control the various shading techniques. The more you work on your images, exploring the powerful capabilities of MacRenderMan, the more detailed your images become. This is a great tool for CAD projects, product design, animation, merchandising, architecture and presentation graphics. Nothing else can compare to the images you'll create with MacRenderMan, the most visually accurate picture making product available for the Mac today.

MacRenderMan is used with 3-D design applications that produce RenderMan Interface Bytestream (RIB™) files. Use your favorite 3-D design system to shape objects. The design software will record these geometric descriptions into a RIB file and spool the file. MacRenderMan reads the spooled RIB file and produces a color rendition, computing it in the background under MultiFinder.

Showplace. Showplace is the forum for your objects created with MacRenderMan technology. Build a dazzling 3-D scene by quickly importing and arranging

MacRenderMan images, or choose from the library of Pixar ClipObjects, including furniture, lamps, a sleek racing bicycle, billboard, shopping bag, a theater spotlight and more. Then turn your camera loose and move around your scene to create spectacular effects and perceive a multiplicity of angles.

Change the "look" of an object by changing its surface: you could have an oak grain table and a stucco-painted wall, or a stucco-painted table and an oak grain wall, or an oak grain shopping bag and brushed chrome walls! With Showplace, you can decide the appearance of an object independently of its shape. Showplace's ability to combine any object with any appearance (including those you create) is one of its most powerful features.

These "Looks" include: bricks, brushed chrome, gold and copper, concrete, gray and rose granite, veined marble, natural oak, plastic and sky patterns, among others. Manipulate characteristics such as shininess, size, roughness and reflectivity.

ALSO AVAILABLE IN CD-ROM VERSION

MacRenderMan and Showplace applications, complete online documentation for both products, a gallery of images created with Pixar products and a sample of Pixar animation all on one CD-ROM!

INCLUDES FREE CLIP PROP KIT

MACRENDERMAN & SHOWPLACE

BCC2410 Showplace & MacRenderMan Bundle \$619.00

BCC2411 Showplace & MacRenderMan CD \$349.00

Showplace: runs on any Macintosh II family computer with a floating-point coprocessor; 32-bit QuickDraw, MultiFinder and at least 5 megabytes of internal RAM (8 is recommended); color display system (for full color viewing, 24-bit is recommended). **MacRenderMan:** Macintosh II, IIx, IIci, IIcx or IIfx running Systems tools 6.0.3 or higher; MultiFinder and 32-bit QuickDraw installed; 5 MB of disk storage; 8- or 24-bit color display system; 5 MB of memory (8 MB recommended); RenderMan compatible design package.

THE BLISTERING 1200dpi, BILLION-COLOR SCANNER!

Presenting The UMAX Line Of Color Scanners And B&W Trendsetters!

REVIEWER'S NOTEBOOK: When the UMAX scanners arrived here at Tiger, their reputation had preceded them. We knew that top designers, architects, artists, pre-press production houses and commercial printers had UMAX flatbeds. A few of us had even seen a UMAX in action.

What surprised us was the prices. This low?

After plugging in the awesome UMAX UC1200S, and scanning a couple of magazine covers, glossy posters, a snapshot of somebody's baby, a 35mm slide of my trip to The Bahamas and our color matching chart — we knew why so many pros use the UMAX. They deliver one-pass, reproduction-quality scans at 1200 dpi! Drenched colors, razor-sharp detail. But the price...How can a product with such a reputation carry such a modest price tag?

UMAX scanners come in a variety of flavors, from a compact, 600 dpi speedster to the top of the line, 1200 dpi hellcat that delivers blistering color scans — It recognizes a billion colors! Rivals the legendary drum scanning technology — at hundreds of thousands less!

Color, black & white, grayscale, halftone — do it all with the amazing UMAX flatbed scanners. For office use, the UMAX black & white scanners pump out 600 dpi images. Feature for feature, nothing outclasses or outperforms UMAX's advanced technology. Great for OCR, handsome desktop design.

Pro-Quality At A Great Price. Scan your brains out with two high powered grayscale scanners! Scanned images look just like the originals. Great for business use, libraries, medical and government applications. Built to stand up to the punishment of constant use. The UG630 is the perfect first-scanner for Mac users.

Very easy to use with advanced features built-in.

The UG630 produce scans with unbelievable 600 dpi resolution. Scan your images in 600 dpi and you'll be hopelessly addicted to the rich tones, crisp detail and ultra-sharp focus. This is the best value in the industry. Scan color photos, black & white photos, line art or text. The optics are extraordinary, and the UG80 and UG630 are crafted for consistent performance, with on-board self-alignment and pin-point precise, and single-light accuracy.

For The Pro Who Knows... The UC1200S

Color Crusader! A massive color hemorrhage! Imagine 1 billion colors at 1200 dpi! That's true professional quality — at a great low price! Single-pass and single light source design eliminates the need for filters and delivers great scans at 10-BITS PER COLOR PIXEL! Life-like images with 1200 by 1200 dpi resolution with full GAMMA correction! We stood with our mouths open when we saw this baby!

Includes PhotoShop LE, a limited edition software release from Adobe, that handles the color explosions captured by the UMAX UC1200S. And this thing flies! Thanks to the ingenious buffering techniques built in.



Color photos, transparencies, illustrations, color graphics and more.

Also includes 600 dpi mode and supports 256 grayscale, halftone and black & white. The choice of ad agencies, publishing houses and designers. When you want the best — don't pay more — ask for UMAX.

UMAX

BCC2546 600 DPI Grey Scale Full Page	\$999.00
BCC2070 600 DPI Color Full Page	\$1295.00
BCC2547 1200 DPI Color Full Page	\$3999.00

ADD SIX SERIAL PORTS — INSTANTLY!

Connect And Control Modems, Printers, Networks, Peripherals And Other Serial Devices. Hardware And Software Included.

REVIEWER'S NOTEBOOK: One of the most useful new ideas in computing — Enables you to control — from a software interface — up to six serial devices. (Macs only come with 2 — Printer and Modem.) It's like adding six serial ports to your Mac (in fact, we found that it's almost like having TWO computers). Configure your equipment any way you like: One Mac to six devices; One Mac to five networks or four Macs to two devices. A snap to install, simple to operate and fully System 7 compatible. Full two-year warranty on everything.

So forget changing cables, swimming through wires and fiddling with A-B switches (those things can actually cause system freeze-up!). Now you simply pop up the MultiPort screen, select the port you want to use from a graphical on-screen diagram — and you're done. Choose from six serial ports and five ADB ports — a total of eleven! The LED lights on the MultiPort unit indicate the port selected and your INIT installs setups for specific situations, each time the Mac is started. There are dozens of possibilities for the MultiPort, like using it "inside out" to allow up to 4 Macs to share two non-LocalTalk devices. You can even have more than one mouse connected to your Mac; your standard Mac mouse for normal use, and a trackball-type mouse for graphics and publishing work.

A must for the Mac user performing multiple tasks and working with assorted equipment. Everything you need to get going is included: controller box, detailed user's guide and accompanying software. Runs off of ADB power, no power supply is needed to operate the MP-91.

Software-Controlled Ports.

This compact little device — about the size of a paperback book — is the answer to connecting extra se-



rial ports and controlling them on your Mac screen. Simple controls allow you to just click to select a port — or to invert the Port in-out lines, or port character-printer or modem. The MultiPort MP-91 is the ideal Desk Accessory that's guaranteed to save you hours of time switching cables, running and re-running wires. It's the easiest system available for multiple port switching.

Here Are The Installation Instructions:

The MultiPort MP-91 simply plugs into the printer, modem and ADB sockets on the back of your Mac. Your add-on equipment (printers, modems, scanners, etc.) are plugged into the MP-91. A software Desk Accessory goes into the System. That's it.

That Was Fast...

And using the MP-91 is even faster! All the selections you make are handled by the software, so there's really no need to touch the MP-91 again. Just tuck it away and enjoy its ingenious functionality. Our "Printer Sharing Test" saw connections of: Four Macs to one ImageWriter; Two Macs to two LaserWriters and two ImageWriters — and a modem; even One Mac connected to two LaserWriters, 1 ImageWriter on LocalTalk, a modem and a scanner.

MULTIPORT

BCC2785 Multiport MP-91	\$229.00
Dimensions: 120 W x 172 L x 38 H mm, 4.75 W x 6.8 L x 1.5 H in.	
Warranty: Two Years On Everything.	

The Small Business Office Assistant.

In this day and age of over-complicated software and highly technical jargon, it's a welcome relief to see something you can really use! And that's what we love best about Office Manager — it does exactly what needs to be done in any small office.

Right out of the box in just a few hours, everyone in your office will be using Office Manager — getting more done in less time. Business letters that used to take 20 minutes are done in a flash! A few mouse clicks is all it takes to print standard business correspondence — and that includes the envelope.

Office Manager is the perfect complement to any accounting application. Together they do 99% of what every small office needs to do. Office Manager is the best way to handle these everyday tasks:

- Maintain Addresses
- Keep To-Do Lists
- Write Letters
- Track Client Jobs
- Print Labels & Envelopes
- Track In-house Projects
- Phone/Fax Dialing (with Call History and Redial)



Track client jobs quickly and easily. User-defined title fields make Office Manager fit your type of business. You'll know in an instant the exact status of any job.

Address Cards. The heart of Office Manager lies in the Address File. From this central hub of vital information, all the various parts of your office fall into perfect place. More than just name, address and phone number — Office Manager is a fully automatic organizer.

LETTERS.

Business Letters. With Office Manager's built-in word processor, you'll whip out business correspondence in record time. Office Manager pays for itself in saved time within the first month. Start with any Address Card, then one quick-click starts a letter — complete with name, address, heading, date and greeting.

Merge Letters. We fell in love with this feature the moment we saw it — easy, instant, customized form letters. What a time saver! If you spend time writing repetitive letters you'll love this feature as much as we do.

Predefined letters like "Thanks for Your Business", "Special of the

Month", "Welcome New Customer", or anything you can think of will be instantly printed with just a few mouse clicks.

Fax & Phone Dialer. How much time do you spend each day, first finding the right phone number, dialing the phone or fax machine, then possibly re-dialing because of busy or wrong numbers? I added it up one day — I spent an average of 45 seconds for each phone call, and over 75 seconds for each fax.

Job Tracking. This potent Job Tracking feature for your clients could be a separate application all by itself. This one's a real powerhouse! Track every phase and part of a job. Every time one of your clients calls, you instantly start tracking a new job. Jot down quick notes for reference. Run the automatic Timer in the background to track your valuable time. Print a Job Report including total time for the job for fast billing purposes.

In-House Projects. There's always a project running around the office that needs your attention. Whether it's what supplies need to be ordered, new topics that need to be covered in the weekly meeting, or ideas for the upcoming company newsletter, you need something to keep track of it all.

Mail Manager. This optional add-on to Office Manager is a must for anyone doing bulk mailing. You get advanced sorting power, elaborate search filters and powerful mail-merge options.

Office Manager Remote. Without investing in an expensive network, Office Manager Remote allows you to enter names and addresses on any remote Mac and later merge the information into Office Manager's main file.

WHITE CROW

BCC2030 Office Manager	\$79.95
BCC2031 Office Manager And Mail Manager	\$119.95
BCC2032 Office Manager Remote	\$65.95

Requirements: Mac Plus or higher with at least 2 meg of RAM and a hard disk drive. Mac system software 6.0.5 or later. Office Manager is system 7 compatible. Each package includes HyperCard 2.1.

The Total Organizer Solution For \$99.

Buy The Amazing Dynodex And Get DynoPage FREE!

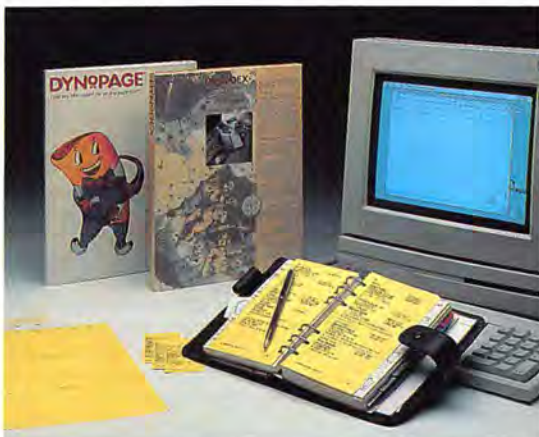
Dynodex is a true personal organizer, capable of handling names, addresses, phone numbers, notes and all other important information — and allows you to print perfect double-sided address book pages that fit virtually any personal organizer.

You'll now have instant access to your personal contacts both on and off the computer. At your computer, instantly look up and dial any number you need from the powerful Dynodex application — or the convenient desk accessory. On the road, all of your contacts are available in your personal organizer. Now your contact information is personal and portable.

The powerful Dynodex database delivers ultra high speed searches: instantly select subsets based on multi-level queries with a set of eight logical and arithmetic operators; for example, "all clients in California contacted within the last 6 months." On sorting: you get 3-key, ascending or descending on any field, along with Dynodex's speedy find, change and global delete. You can delete duplicates, Fast-Find and display any record instantly by simply clicking on it in the list window.

If your information resides elsewhere, Dynodex allows you to quickly import it for immediate use. Any text file, tab-delimited or comma-delimited file is ready to use, and Dynodex includes a free copy of DynoStack, for importing HyperCard, Focal Point and Quick-Dex address files.

On to Dynodex's powerful (and very smart) printing capabilities: You can print any size address page, even double-sided pages. Print in any font, size and style on a field-by-field basis for great pages.



FREE DynoPage. This amazing printing utility allows you to print documents at reduced sizes and on both sides of the paper. Double-sided pages are much easier to print using DynoPage, and can be printed to any size from full-size letter, legal or tabloid, to "photo-retouched" sizes for personal organizers such as Day-Timer, Day Runner, Filofax, Franklin or any custom size you want. Just drop-and-drag to print from the Finder! They couldn't have made it any easier. DynoPage comes complete with over 100 built-in layouts, and prints text in any font, size or style that's used in the original document.

Anything you can get on your Mac screen can be printed in any size or layout using DynoPage. In addition to 1-2-3 spreadsheets and charts, you can print word processing files, presentation pages, database files and more — to any size you like.

You can even print your spreadsheets to create great little "fold and staple" booklets, or print reduced versions of your spreadsheets on larger sheets to use as

handouts during presentations.

DynoPage prints in a variety of useful configurations, and comes complete with 40 sheets of Dynodex Instant Address Book Paper (six-ring along with half-page), dozens of pre-designed layouts, a comprehensive manual brimming with tips and techniques and a valuable coupon for big discounts on personal organizer products. Here's a look at what you'll be able to create with DynoPage:

Dynodex 2.0 Wins MacWEEK Target Award

Editors Call It "Best Overall Choice" In choosing Dynodex 2.0 as an award recipient, MacWEEK's editors wrote: "Dynodex significantly edges out the competition in performance, especially with larger address lists. The program's strong points include a streamlined interface, complex phone-dialing capabilities, versatile import and export features, and a thorough and well-written manual. Unparalleled printing versatility, including address books, labels, envelopes and rotary-file cards.

TIGER EXCLUSIVE!

Dynodex w/Free DynoPage and a package of DynoPaper of your choice.

90 day limited offer (expires August 31st).

PORTFOLIO SYSTEMS

BCC2542 Dynodex Macintosh w/Free DynoPage	
Macintosh & DynoPaper	\$99.00
BCC2826 Dynodex Macintosh	
Competitive Upgrade	\$49.00
BCC2442 DynoPaper (white, cream, gray, yellow)	\$14.00
Macintosh Plus, SE series, II series, or Portable; System 6.0.3 or later	

The Piano That *Teaches* You How to Play!

I remember being forced into taking piano lessons as a kid. My piano teacher, Mrs. Reymers, was sort of a crabby woman who'd smack my hands with a ruler when I missed a note. During my lessons, fun was the furthest thing from her mind. The repetition, the drills — I eventually quit and I've regretted it ever since. If she had injected a little fun into those lessons, I'd be on tour with The Rolling Stones today!

Now it's my turn to decide on piano lessons for my own kids. I introduced my nine-year-old, a self-proclaimed Nintendo master and junior Mac hacker, to the Miracle Piano Teaching System about four months ago. His first question was "How do I fire the weapons?" Wise guy.

I left him alone with the Miracle and waited to hear something. Ten minutes later I heard Mary Had A Little Lamb, then Chopsticks and then the theme song from The Jetsons. I rushed back to his room and found him with that look on his face — the same look he gets when he reaches a new level in Zelda.

I saw that this thing really works. Today, he's writing his own tunes and getting better each day. He's enjoying music, he doesn't get hit with a ruler and all I have to do is encourage him.

The Only Self-Teaching Piano. The Miracle Piano Teaching System can teach anyone — child or adult — to play the piano with a series of progressive, customized lessons. The Miracle quickly connects to a Macintosh or PC and includes software cartridge that combines an advanced MIDI keyboard with full-stereo sound and brilliant on-screen graphics. In no time at all, students of all ages will learn and perform left and right handed melodies — while having a lot of fun!

There are exercises, musical pieces and drills (cleverly disguised as games), that teach hand positions, notes, fingering, rhythm, scales and more. The Miracle can be quickly set up for any age or expertise, and customizes itself to move the user along at a comfortable pace.

Unlike conventional piano lessons, The Miracle eliminates boring, repetitive routines. The super-creative, artificially intelligent software quickly teaches the basics and builds on them in very entertaining ways. And that makes all the difference.

The Keyboard. Dazzling music! Spectacular effects! Booming orchestras — all created by you — the Miracle keyboard — and a NES. As a stand alone instrument, The Miracle rivals the music industry's most sophisticated MIDI consoles. The 49 full-size keys are velocity sensitive, so you can learn to play utilizing true piano expression. You also get a foot pedal, which controls the length of time each note is sustained and stereo earphones.

The Miracle can produce sounds from its library of over 100 instruments, sounds and effects programmed by a leading motion picture sound designer. To produce its superior acoustics, the Miracle uses sampled sounds, it can be connected to a home stereo system for rich, full sound.

It's Not Just For Kids! The Miracle is a lot of fun and kids all over the world are entering the world of music because of it. But it's not just for kids. The fact is, The Miracle is a breakthrough step in piano self-teaching. If you're an adult and would love to play piano (but think you're too old to learn), The Miracle can teach you with as little effort as it teaches the youngsters. And you'll enjoy it just as much!

It's Not Too Late To Learn... The Miracle is not a toy (but don't tell your kids!). It's so ingenious, it can teach anyone — at any age — how to play piano. The Macintosh and PC software contain exercises specifically designed for

adults, too. You don't have to know anything about the piano, you don't have to read music, and you can have a lot of fun! Normally, adults have a tough time learning something like the piano, but with The Miracle, it's easier because it moves at whatever pace you're comfortable with. If you want to start out learning just one song or melody, you can just work on that, and The Miracle follows you. As you become more comfortable, The Miracle can adjust to whatever method and speed you like.

Endorsed By Educators, Kids And Parents. Everyone loves the new Miracle system. Musical educators love the way it encourages children to practice, making a fascinating game of the piano. And, of course, kids love it because it's not like learning; it's a challenge. Parents love it because...well, what parent doesn't enjoy the sounds of their children enjoying a musical instrument?

The Miracle provides the ability to create over 100 instrumental sounds... **Classical:** Clarinet, Oboe, Strings, Sfx Brass 1, Xylophone; **Rock:** Fuzz Guitar, Stop Guitar, Pluck Synth, Stick Bass, Percussion 1; **Jazz:** Saxophone, Vibraphone, Jazz Guitar, Fretless Bass, Percussion 3; **Blues:** Harmonica, Organ, Steel Guitar, Electric Bass, Percussion 1; **Rap:** Kalimba, Mod Synth, Clean Guitar, Moog; **Latin:** Pan Flute, Marimba, Guitar, Upright Bass, Percussion 2; **Country:** Banjo, Violin, 12-String Guitar, Detuned Piano, Percussion 1.

Here's What You Get Free With The Miracle — Only From TigerSoftware. When you buy a Miracle from TigerSoftware, we'll throw in everything you need to create your own recording studio. We'll start with the Miracle Song Collections, Volumes 1 and 2 containing dozens of popular songs from the Beatles, to Michael Jackson. Play along with your favorite songs, or break out into your own solo. These song collections are a great value and are yours free only from Tiger.

Then we add a copy of TRAX, the MIDI recording software that allows you to create your own smash hits. Change the tempo, mix different instruments, add your own vocals, sound effects and more — controlling it all from your keyboard. The TRAX interface is simple and fast, enabling you to lay down tracks using your Miracle to create your own arrangements.

FREE WITH THE MIRACLE

Everything you see below: Miracle Song Collection Volume 1, TRAX MIDI Recording Studio and Miracle Stand pictured on the top of this page.



As Seen On
"Good Morning
America," "Today
Show" and
Arsenio Hall!

But That's Not All. You also get the Miracle keyboard stand you see pictured at the top of this page. With all this, you'll be ready to create your own live performance or cut your own record.

With The Miracle, you or your child can learn to play without the boring drills and monotonous practice that music usually requires.

Now There Are 40 More Ways of Playing To Learn Instead of Learning To Play! With The Miracle Song Collections, you can add dozens of popular titles to The Miracle Piano Teaching System. All the features that are quickly making The Miracle the most popular keyboard learning method available are fully functional when you use the songs in this collection.

Custom exercises. Video game action. Full monitoring and learning curve analysis. All of it! And best of all, each song is arranged for two levels of playing difficulty: Novice and Expert.

Each volume contains 40 great songs chosen to represent a wide variety of popular musical styles. Rock & Roll. Country. Pop. Rhythm & Blues. Just pick the tune, and in no time at all you're playing it like a pro! All songs are fully arranged so you can hear a complete accompaniment along with your performance. It's like turning a piano lesson into a jam session!

An Instrument That Grows With You. The Miracle is not only an ideal tool for learning, it delivers lasting value as a high-quality, sophisticated musical instrument. With over 100 other instruments available, and a built-in stereo sound system, you can make an entire orchestra come to life whenever you play. As you grow as a musician, The Miracle is compatible with the entire world of modern synthesizers through built-in MIDI connections. (That's Musical Instrument Digital Interface, the worldwide standard for computerized music.) The most amazing educational tool to come along in years.

FIRST TIME ANYWHERE!

MIRACLE FOR THE MAC
TIGER'S GOT IT IN STOCK, READY TO SHIP!
NEW PC AND MAC VERSION!
BOTH INCLUDE FREE HEADPHONES!

MIRACLE

BCC2778 Miracle for Mac Bundle	\$399.00
BCC3781 Carrying Case	\$39.95
BCC27792 Song Collection Volume 2	\$39.95

ORGANIZE TIME!

REVIEWER'S NOTEBOOK: Taking care of business just got a lot easier. First Things First is an award-winning time management utility that has no learning curve — it's immediately useful right out of the box. It puts up a unique Floating Clock-Icon, which stays "on top" regardless of how crazy your desktop gets. It not only always tells you the time and date, but also provides instant access to ToDo lists, to check your schedule, or to set up a Reminder. Just double-click on it, or use the program's built-in hot key, and you are managing your time without wasting any of it.

Extremely fast. Non-obtrusive, with 30 action/task categories. There's even a built-in demo program for you to copy freely and share with other Mac users. We can't really manage time — it flows on relentlessly — but we can do something about our priorities!

Perfect timing. It's either the result of incredible luck or determined effort. In business, however, you can't always depend on luck. Even the most organized people have trouble keeping track of all the things they must (and want to) accomplish and which order they should be done it. The secret is to be able to instantaneous-

ly recall the most important thing to do next. That's where the power of First Things First comes in.

Time-dependent tasks, appointments and deadlines simply don't care if you have enough time to organize them. And unless a time manager is fast and easy, it is of little use. First Things First is extremely easy to use, delivering instant access to your list of tasks and details. It allows you to organize your efforts by category or project, and keeps you in touch with the big picture even in the wake of interruptions, crises and priority shifts.

You'll quickly create categories, establish reminders and things to do, view and print your lists and pop up your current top priority items with the click of the mouse. First Things First is always instantly available and twice as fast as any desk accessory. No application to launch, no menu items to find — ever. And you'll have almost unlimited capabilities for customizing First Things First to fit your personal style. That's important.

The floating clock-icon is an access device unique to First Things First. In its 3-dimensional form, it actually decorates your screen. Or, if you like, you can park it in a reduced form in the menu bar. Either way, you just double-click on your clock (or use the built-in hot key of your choice) any time you want to access your time management utility. Nothing could make more sense or be more intuitively usable! Organization becomes an easy habit.

Creating new Reminders or ToDo list items is simple — just click on the New button and enter the text for your Reminder or Things To Do. You can choose any category you want and set a time and date, or simply create a list of unscheduled things. You can also assign your Things To Do a priority level from 1 to 4, in order to more easily track what's most important, in addition to what is urgent. Whenever you want to see your top priority items for today, all you have to do is Option-click on your clock.

You can customize your listing of Things To Do and scheduled events however you like — according to cat-

egory, time-range, and priority level. Best of all, since First Things First uses pop-up menus to let you make your viewing selections, you can always see exactly what your current view selection choices are without having to click on a menu or open a dialog box.

Customizable Time Range. Version 2.0 offers you the ability to customize the time range of the tasks and reminders to be viewed. Easily call up a dialog box to input the start and stop date.

Import/Export — Great for Mac Portables. Version 2.0 offers flexible options for converting personal information data from other programs into First Things First and exporting to text formats or to update other First Things First data files. This makes it ideal for Mac Portable users who want to be sure they have the most recent task and scheduling information on both their portable and desktop Macs!

FREE FROM TIGER

DYNODEX A \$129 VALUE

A true personal organizer, capable of handling names, addresses, phone numbers, notes and all other important information. It allows you to print perfect double-sided address book pages that fit virtually any personal organizer. So you now have instant access to your personal contact information — both on and off the computer.

VISIONARY SOFTWARE

BCC2403 First Things First 2.0 \$69.95
Any Macintosh with at least 1mb of RAM and System 6.0.4 or later.

INTRODUCING NEW GUARANTEED UNDELETE

Retain Original File Location And Recover Deleted Files!

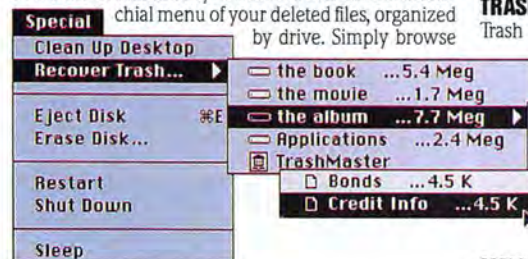
REVIEWER'S NOTEBOOK: Tiger is proud to present Guaranteed Undelete, one of the most useful products you'll ever own — it is the only utility that guarantees that your deleted files WILL NOT be overwritten. Deleted files are recovered in the order they are deleted.

We'll take a look at TrashMaster and Incinerator, the most sophisticated Trash utility ever devised, complying to U.S. Department of Defense specifications.

Two of the most ingenious products we've seen in years, they can save your life in those dark moments when something goes wrong or someone makes a fatal error.

GUARANTEED UNDELETE. The act of Undeleting a file can be a tricky process. Often, recovering a file is like playing the lottery: you're taking your chances that the file is still intact. Guaranteed Undelete is the ONLY undelete utility that retains the file's original location and hierarchy. It also guarantees the recovery of the most recent deleted files.

Guaranteed Undelete is very easy to use, just hold down the command key to access a convenient hierarchical menu of your deleted files, organized by drive. Simply browse



the menu and select the deleted file or folder that you want to recover. That's it!

IT'S AS IF YOU NEVER LEFT... Recovering a large folder could be a nightmare with other utilities, but it's a breeze with Guaranteed Undelete — just one click and all of the files are returned to their original location. Just as they were, just that simple. And Guaranteed Undelete is network savvy, enabling you to recover files on remote volumes. It's also the ideal safety net if you copy files back and forth to your PowerBook. By the way, PowerBook users get a second license free.

TRASHMASTER — With Incinerator. The classic Trash utility. TrashMaster allows you to securely erase files, protect important data and manage your trash with a number of ingenious and easy-to-use options.

Without TrashMaster, deleting a file doesn't erase it. That file is available for you — or someone else — to recover. There's no safety.



TrashMaster's "incinerator" completely erases files you don't want anyone else to see. You select the files to be erased (by name, type or creator) — and they are automatically eliminated per United States Department of Defense specification.

Nothing else can erase files with this degree of security.

WHEN'S TRASH DAY? You can choose when your trash gets emptied, and even what trash. Using a hierarchical menu, you simply select the file, folder or volume that you want to empty. While it used to be all or nothing when it came to emptying

the trash, TrashMaster lets you be very selective. You can even make the whole thing automatic by specifying the date, size, type or name of the files that get emptied — and when (hourly, disk eject, shut-down, etc.). This is a great way to get rid of files that clutter your disk. Tell TrashMaster to take care of them before they pile up.

GUARANTEED UNDELETE

BCC2903 Guaranteed Undelete \$44.95
System Requirements: Compatible with Mac Plus or later, System 6 or higher. System 7 savvy, including balloon help. A/UX compatible.

Automatically Remove Jagged Edges!

New JAG Is The Ultimate Anti-Aliasing Tool For The Mac...

REVIEWER'S NOTEBOOK: The "jaggies" are gone! Improve your PICT and PICS files to pixel-perfect sharpness and clarity in seconds. This is a product worth its weight in gold for Mac painters, animators, 3-D modelers and photo retouchers/enhancers. Powerful anti-aliasing and edge-detection technology polishes your images for smooth curves, razor-sharp edges and deep, rich detail. Supports 8 and 24 bit still images and animations.

For 3-D rendering applications, JAG cuts your production time by up to 75%, eliminating the need for oversampling. Jaggies are handled AFTER the rendering is complete.

Works with all the top programs: Pixel Paint, Studio 8, Oasis, UltraPaint, PhotoShop, ColorStudio, Studio 32 (and other software with built-in anti-aliasing), MacroMind Director, Gold Disk Animation Works, Swivel 3-D, Swivel 3-D Professional, Ray Dream Designer and more.

Nothing looks like JAG enhanced images. If you want pro-quality work, nothing we've seen anywhere is better. This product has exploded in popularity as the Mac has become the perfect graphics front end. Try it once and you'll be spoiled...

Stop Tolerating The Jaggies! JAG is compatible with virtually all leading Mac color graphics and animation software, with full support for PICT and PICS file formats. It's advanced anti-aliasing technology cleans 8-bit paint images with unbelievable results, and its sophisticated

anti-aliasing techniques for 24-bit images allow greater freedom when working with 24 bit paint and retouching programs. For Mac animators, JAG delivers spectacular 8-bit multimedia presentations. For 24-bit animations, JAG can handle studio quality frame-by-frame, full color output to tape.

For smaller text and single-point images, JAG puts meticulous controls at your fingertips to protect the sharpness and color. The edge tracking mechanism is fast — unbelievably fast! You'll see crisper, cleaner images in record time.

And high-res is handled up to 4K, for seamless integration into professional graphic production environments. JAG works quietly in the background, so you can continue to work on your Mac while it performs its magic on your images and animations. There's batch



queue and interruptable processing, adaptable palettes and custom dithering so you can achieve the photo-realism of 24 bit brilliance on your 8 bit system!

IT WAS A DAY LIKE ANY OTHER DAY --
AND THEN SHE WALKED INTO MY LIFE



BEFORE

IT WAS A DAY LIKE ANY OTHER DAY --
AND THEN SHE WALKED INTO MY LIFE



AFTER

JAG

BCC2535 JAG \$65.95

Two Words To Success: OUTLINE & ORGANIZE



REVIEWER'S NOTEBOOK: Outliners are fast becoming a standard in today's office environment. While word processors evolve into desktop publishers, outliners have become a vital tool that turn shadowy thoughts and ideas into focused plans of action. Acta 7 is the industrial-strength

thought-processor that stands heads & shoulders above the rest. Here at Tiger we can see how it earned its reputation as "the easiest-to-use thought processor for the Mac".

If you're still using a word processor to gather and organize your thoughts — think again. This is the breakthrough of the 90's. Outliners are ideal for capturing quick, fleeting brainstorming before they can get away. I always keep Acta 7 running in the background. Bright idea? Click — it's instantly noted. When I'm ready, I review my notes and organize them. Rearranging, grouping, evaluating importances and so much more. That's the power of Acta 7. It processes my thoughts.

Outliners are better than word processors for developing concepts, plans, letters and so much more. With its built-in hierarchy of levels and sub-levels, it's easy to rearrange various parts to really fit. The important items bubble to the surface while subordinate ones fall

into perfect place. We find using an outliner a time-saving tool for all our writing. It's simply better-suited for the task than any word processor, but that's only the beginning.

Also Available From Symmetry:
MARIAH

REVIEWER'S NOTEBOOK: Another superior product from the makers of Acta 7 is Mariah — the world's first multimedia organization and retrieval utility. Desktop graphics and multimedia are exploding at a phenomenal rate. You do things on your Mac unheard of just a few years ago. But what about organization? What do you do with all those files, and how do you keep them organized — yet retrievable? Mariah is a heaven-sent tool for every graphics operator. We put all our files in one Mariah "Collection". Now, to find a file we just enter a keyword or two for instantaneous searches, or pull up full-color thumbnails for visual browsing. Finding images we haven't touched in years is now easy and fast.

Mariah lets you manage graphics, sounds, animation, text and more. All in one easy-to-use file. All easily retrievable — fast. All types of files, from B&W to 32-bit color Paint, PICT, PICT2, TIFF (Mac or DOS), EPSF (Mac or DOS), as well as Scrapbook and PictureBase formats.

And when you find that special file, what do you do? Listen to sound files, play animation files, cut and paste graphics, convert formats and more — all from within Mariah.

Build huge collections of mixed "stuff" that can be sorted, gathered and retrieved at amazing speeds.

Search through one hundred megabytes of 3,000 items faster than you can say, "Searching Mariah Collections is bullet fast."

You can routinely work with 90 to 100 megabyte Collections. Just dump it in and let Mariah go to work. The Boolean search (using AND, OR and NOT functions) screams through hundreds of megabytes and infinite items in seconds.



Instant full-color thumbnail viewing! Scroll through Collections page by page or view rows of thumbnails all at once. Sound clips, animations, and mixed graphics can be viewed in the same Collection.

SYMMETRY

BCC2066 Acta 7 \$75.95
BCC2065 Mariah \$79.95

Create Powerfully VISUAL Desktop Presentations! NOTHING GRABS AN AUDIENCE LIKE CA-CRICKET PRESENTS...

REVIEWER'S NOTEBOOK: CA-Cricket Presents and CA-Cricket Graph are two of the easiest graphics packages in the industry today. CA-Cricket Presents combines all the necessary tools you'll ever need to develop, organize and deliver a professional presentation to peers, superiors, prospects, corporate management or the financial community. If time is tight — when isn't time a consideration? — CA-Cricket Presents is the only package you could use — it's fast and simple, designed so well that you follow logical steps to a great presentation. The Acta Outline Processor helps you quickly organize information, ideas and major points. A complete set of templates and palettes help you add sizzle and splash — and choose from dozens of professionally designed backgrounds, borders, frames, color combinations, layouts and graph types and tables. You can add your company name, or any other custom element in seconds for great presentations.

CA-Cricket Graph, also reviewed here, is the perfect tool for serious graphing tasks. Professional power, yet sleek and simple to use. Very flexible, allows 12 different graph types. A great companion product to CA-Cricket Presents.

CA-CRICKET PRESENTS... (A hush falls over the crowd.)

Whether you've been asked to prepare a killer presentation with an impossible deadline, or you've got the luxury of a little time, CA-Cricket Presents is the package you should reach for. It's extremely visual, with tools designed specifically to speed the design process. Because pictures are better than words, great pictures are best — providing maximum impact and clear communication. Create 35mm slides, dazzling overheads, speaker's notes and pro-quality handout materials. The graphic design is built-in: a collection of magnificent templates that are ready to use, or can be altered to meet your specific needs... in seconds. CA-Cricket Presents also knows how successful presentations should be assembled, providing great outlining tools to focus your efforts. The Acta Outliner, mentioned earlier, is an innovation in presentation software, helping you formulate and organize your ideas. Along with the Templates and Palette tools, there's a feature that AUTOMATICALLY assembles your presentation for you! It's called Auto Presents. Just enter your text in the Outliner, select a template and your ideas instantly become a full-blown presentation!

Advanced users will love the comprehensive set of tools available to them. Unmatched text manipulation tools, drawing features, sophisticated graphing and table capabilities. The CA-Cricket Presents file integration allows you to work with images and other graphics from PICT, PICT2, MacPaint and EPSF formats. Import text from your word processor, or any information you need quickly from your database or spreadsheet, using SYLK files.

Then there's CA-Cricket Presents' masterful Presentation Management. An array of easy-to-use tools that keep your presentation organized and running smoothly when you're in front of the audience. The "Electronic Light Table" allows you to quickly arrange and re-sequence your individual frames as if they were spread out on a light table. Fascinating feature, very convenient. Sort by title or image — even allows you to incorporate frames from other presentations for tremendous time savings during rehearsal and editing. Last-minute changes or re-thinks are no problem.

The "Speaker's Notes" feature allows you to build a frame-by-frame script for your presentation. A tight, well-written script is critical to a successful, communicative presentation. CA Cricket Presents lets you add notes directly or paste them in for automatic place-

ment on each frame. You can't get lost, so you can be confident as the curtain goes up on your presentation. "Video Presents" is your rehearsal director, advancing frames as you speak, great for fine tuning your timing. CA Cricket Presents not only helps you create a great presentation — it helps you deliver it.

Present Information Like A Pro...

Professional sales people, fund raisers, financial consultants and marketers prepare a variety of materials. Slides, handouts and notes are useful in keeping an audience glued as you speak. You can produce high-resolution, professional quality black and white and color output from a wide range of film recorders, image setters, ink jet, thermal and laser printers. CA-Cricket Presents also includes a driver for the Autographix Overnight Slide Service. Or you can use Video Presents to run your presentation on-screen with special effects, transitions and variable timed automatic frame advance. CA-Cricket Presents runs on The Mac Plus, Mac SE and the entire family of Mac IIs with speed and grace.

CA-CRICKET GRAPH... Professional Graphs In Just Seconds!

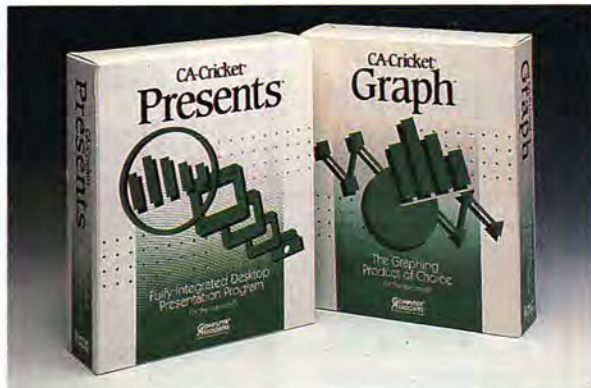
CA-Cricket Graph is the standard in Macintosh charting. You won't find the depth or sleek operation of CA-Cricket Graph anywhere else. Just enter your data into the program itself or import it directly from your word processor, database or spreadsheet and select one of 12 chart types. Includes Scatter, Quality Control, Stacked Bar, Pie, Double Y, Polar, Column, Line, Area, Stacked Column, Bar and Text charts. Great for business, engineering, statistical and scientific users. Change a number — or even chart type — then just click the "New Plot" command and your chart is instantly drawn. Unlike other charting products, CA-Cricket Graph gives you total control of every graph element. Customize your graphs with fast, easy data importing in text, SYLK, JWKS and WKS formats. Format your data window any way you like, enter up to 100 columns and 2700 rows of data. Select from 16 bar patterns, 48 plot symbols, 6 line styles and 5 line widths. Choose your fonts, type styles and sizes. Place



lines, text, arrows, rectangles ovals and other elements anywhere you want. Position your graphs wherever you like and even stretch or shrink them to fit any layout. Overlay multiple sets of data and add colors to your backgrounds and objects with just a mouse click.

You'll quickly manage and display data in a range and format that is instantly graphed, including decimal, alphabetic, scientific, percentage, and currency formats. Output top-quality graphs, including multiple graphs per page.

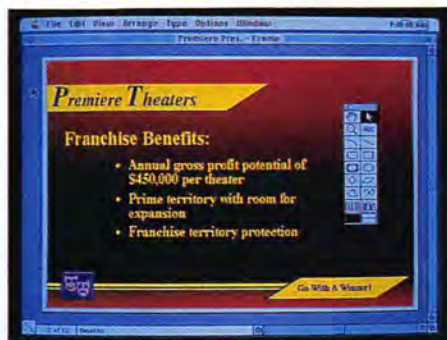
The ability to export graphs in PICT format makes



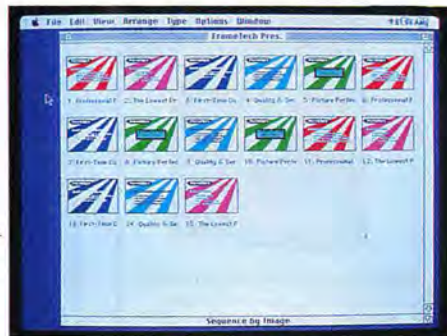
CA-Cricket Graph an excellent tool for use with desktop publishing and desktop presentation applications. Graphs can also be printed on your LaserWriter, ImageWriter II or any choosable selectable device.



Create dazzling intro screens and transitional slides.
Instant backgrounds, graphics and more!



CA-Cricket Presents gives you pro-quality text.



Slide sorter makes arranging presentations easy.
View every frame on an "Electronic Light Table".

CA-CRICKET PRESENTS

BCC2806 CA-Cricket Presents \$139.00
BCC2807 CA-Cricket Graph \$89.00

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MacUser September 1992 307

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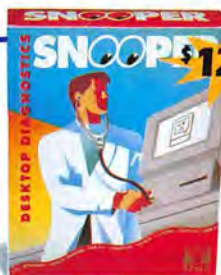
We guarantee overnight delivery to every address in the continental U.S.A! *If you don't get your in-stock order the next day, we pay the shipping! If you are not 100% satisfied with the products you purchased, return within 30 days for a full refund. Please ask if the item you wish to purchase carries a money back guarantee when you order (see policies for details). Let Dr Mac take care of all your Macintosh needs — 100% guaranteed!

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THIS MONTH'S SPECIALS

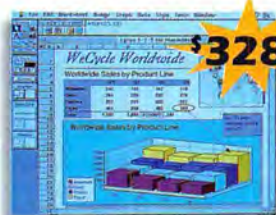


\$124

SNOOPER

...Lets You Find the Problem

Diagnose from your desk with SNOOPER. SNOOPER performs a comprehensive suite of tests, checks all your hardware and identifies any problems. The same SNOOPER software runs on all Macs. SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with SNOOPER, the hardware diagnostic.



\$328

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Powerful, graphical, easy-to-use spreadsheet features you won't find anywhere else. Edit text, data, or formulas right in a cell. Or rearrange graph elements in seconds by clicking and dragging them. What's more, enjoy file, macro, and keystroke compatibility with other versions of 1-2-3. Order now and get a free video introducing the great features and functions of Lotus 1-2-3 for the Mac! (While supplies last!)



\$28

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\$153

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An easy-to-use, yet comprehensive presentation charting solution that provides 40 different chart types and 80 subtypes, as well as full slide show capabilities. System 7.0-savvy with complete formatting control, pre-formatted chart and clip art libraries, and extensive data importing, incl. hot links to Excel. The slide show enables users to customize presentations with visual & audio transition effects or QuickTime movies, and to create run-time versions for play-back without DeltaGraph.



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Imagine updating all of your Macs with the touch of a button. With Version-Territory, updates that took hours in the past now take just a few minutes. Examine Macs, distribute documents, update software, utilize the power of your network with VersionTerritory.

UNLIMITED USER VERSION...\$1188



\$1299

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Umax, the Image expert, offers the UC630 24 bit image scanner. This versatile and full-featured scanner can handle color, greyscale, line art and text at a price/performance level superior to any other color scanner on the market. The UC630 also come bundled with Photoshop software.



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Hard disk protection while you're away & screen protection while you work. Secure your hard disk with any of 3 protection options.

\$91

FOLDERBOLT

Folder level security that's fully integrated into the desktop. Create completely locked folders, read-only folders, or one-way deep folders.

\$74

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1. For how many micro computers do you buy products? (check one)

☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

2. Your primary job function is: (check one)

☐ 01) Administrative/General Management ☐ 03) Engineering/R&D
☐ 02) MIS/DP, Communications Systems, Programming ☐ 04) Finance/Accounting
☐ 05) Marketing/Sales ☐ 06) Computer Dealer/VAR

3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

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5. If so, what function do you serve in the buying process? (check all that apply)

☐ 01) Initiation/ Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)

☐ 01) over \$5 million ☐ 05) \$50,000 - \$99,999
☐ 02) \$1 - 5 million ☐ 06) \$10,000 - \$49,999
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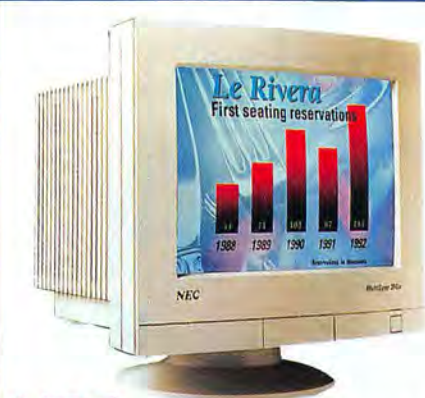


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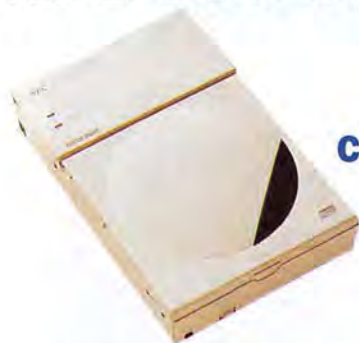
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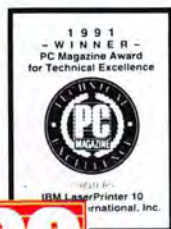
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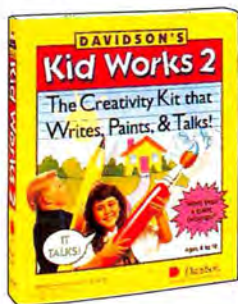
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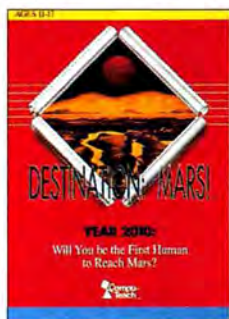
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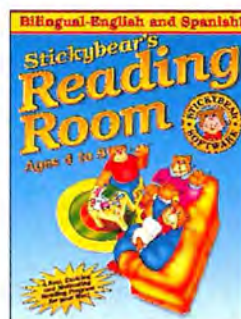
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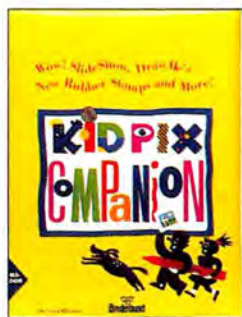
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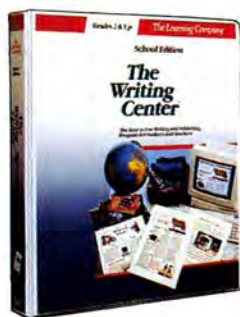
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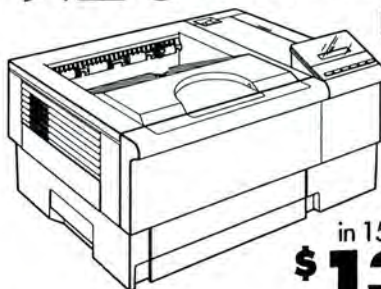
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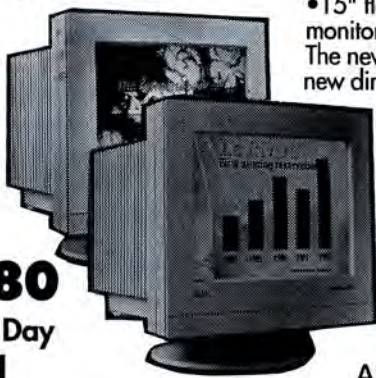
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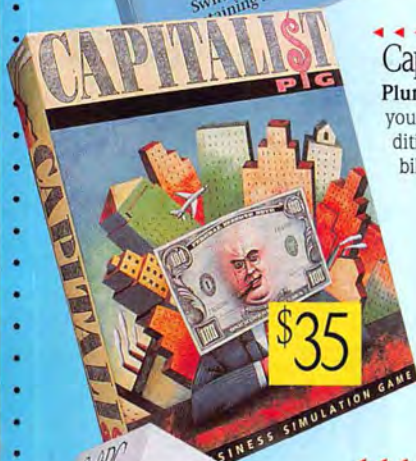
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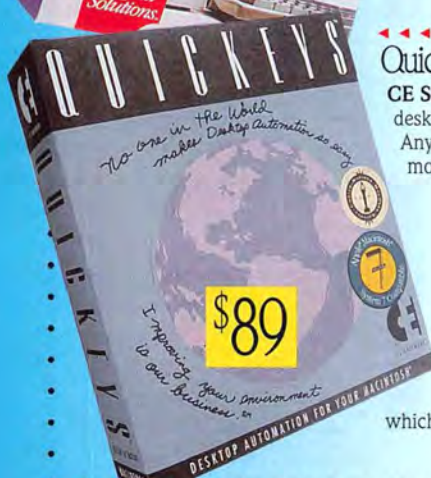
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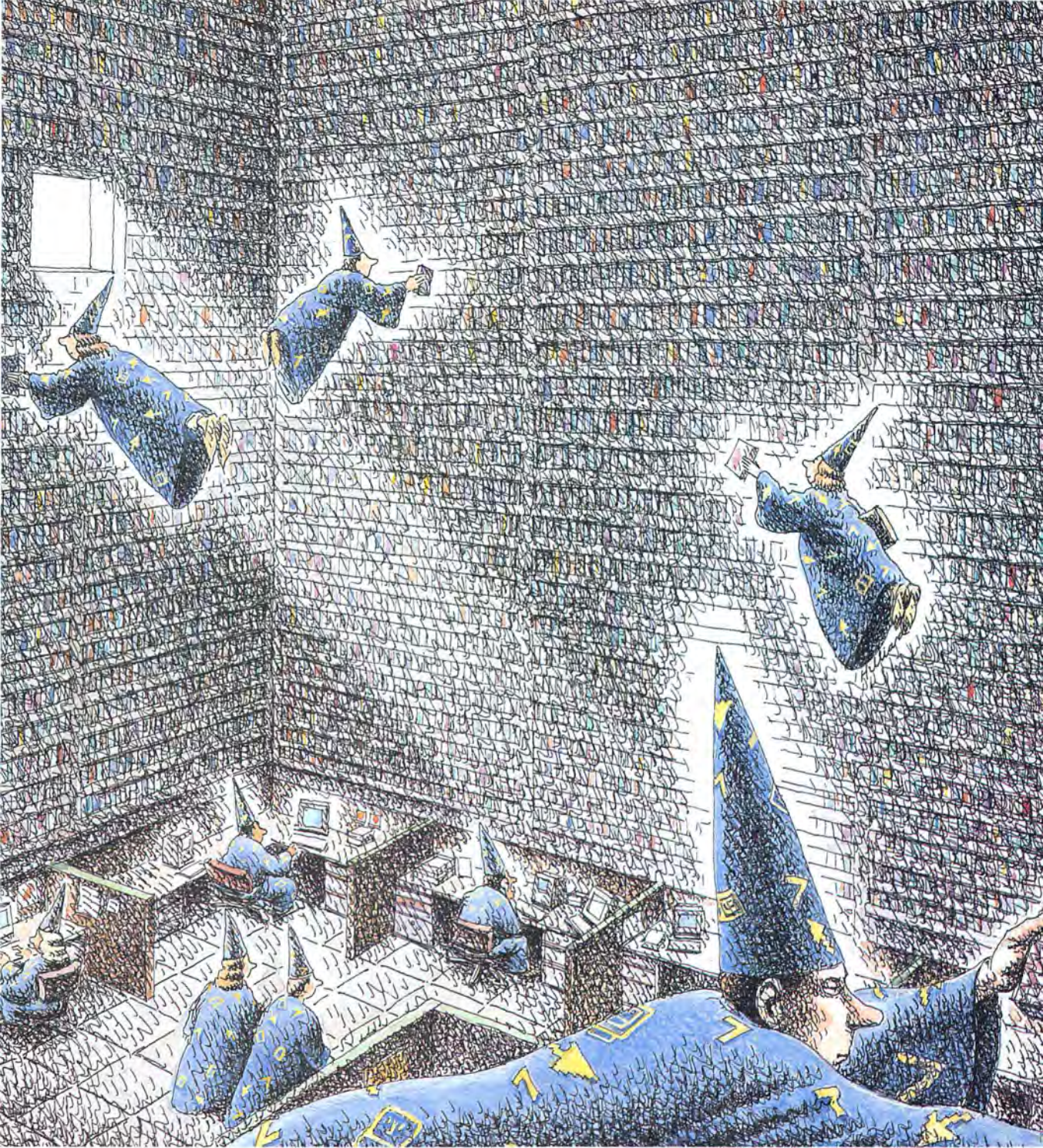


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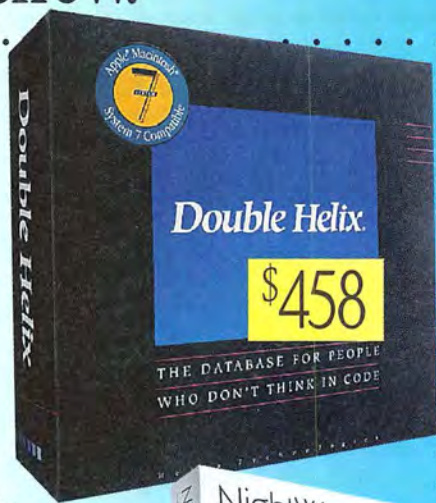
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37/16

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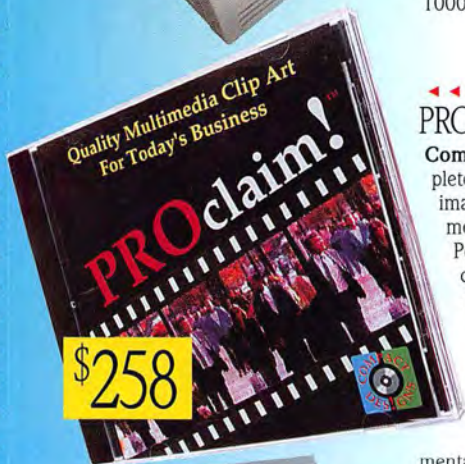
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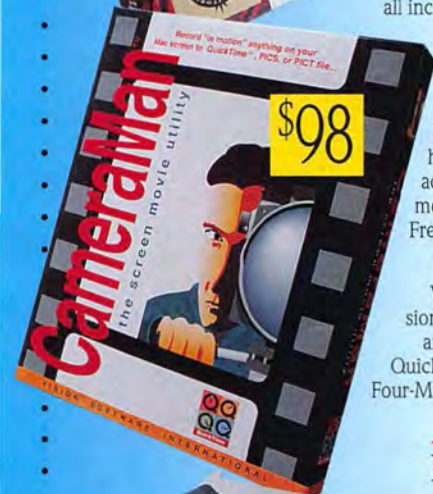
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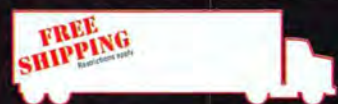
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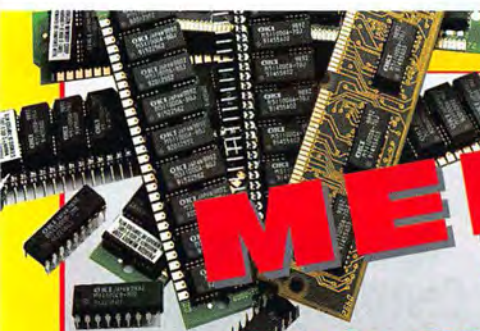
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Seagate

	Intl	Extl
49MB/28ms	\$234	\$304
426MB/14ms	\$1129	\$1199
676MB/12ms	\$1519	\$1699
1020MB/15ms	\$1895	\$1998
1420MB/15ms	\$2295	\$2395
1352MB/12ms	\$2699	\$2799

CIRCLE 237 ON READER SERVICE CARD.

THIRD WAVE SELLS ALL MODELS OF MACS!

**BEST
PRICES!**

QUADRAS—POWERBOOKS



**CALL FOR PRICING
ON ALL MODELS OF
MACINTOSH CPUs**

We can help you design your entire system. Just give one of our sales consultants a call.



THIRD WAVE OPTIDISK 128

The new removable standard!

128MB per cartridge at only 30% the media cost of SyQuest! Plus the data reliability inherent in magneto-optical technology. Prices start at only \$1299 and the 128 MB cartridges are only \$49. Ask about our special offer for qualified service bureaus!

ASANTÉ ETHERNET FROM \$169

5 Year Warranty Rated Number One by MacUser

Thick/Thin or Thick/10T	169.00	SCSI Ethernet from	299.00
Thick/Thin/10T, 64K	229.00	Dayna Etherprint	335.00
Friendly Net/Thin or 10T	229.00	Dayna Etherprint Plus	605.00
10T 12 port hub	529.00	16MHz 882 option	
10T 8 port hub	299.00	for LC Ethernet	49.00
AsantéHub 1012	CALL	20MHz 882 option	
Thick to 10T adapter	99.00	for IIsi Ethernet	69.00

CACHE CARDS, ACCELERATORS, AND COPROCESSORS



**RADIUS ROCKET-
DAYSTAR POWERCACHE-
MACWORLD EDITORS
CHOICE 1992**

TokaMac 040 Accelerators
rated faster than the Quadra in
three out of four benchmarks.
MacWeek - 10/22/91

Cache cards from Logica speed up your IIsi or IIsi by 40 percent! The LogiCache IIsi plugs into the IIsi slot or into the Logica Dual Slot Adapter for use with SE30 or IIsi expansion cards. Logica math coprocessors for LC, LC II, Classic II, and IIsi speed math calculations by over 100 percent. For maximum performance, choose '030 accelerators from Applied Engineering and Daystar, or '040 accelerators from Fusion Data and Radius.

LogiCache IIsi 64K Cache	139.00
LogiCache IIsi 64K Cache	149.00
IIsi Dual Slot Adapter	59.00
20 MHz Math chip for Adapter	69.00
DayStar PowerCache 33,40,50 MHz	CALL
DayStar PowerCache above w/882	CALL
Radius Rocket and Radius Rocket 25i	CALL
Applied Transwarp 040	1749.00
Applied Transwarp LC 33,40,50 w/882	CALL
TokaMac 040 Accelerators for the LC, IIsi, SE 30, IIsi, and the Mac II FX	CALL
16 MHz 882 CoProcessor for LC, LC II	69.00
16 MHz 882 CoProcessor for Classic II	69.00

DISPLAY SYSTEMS



SuperMatch color displays 17 - 21 inches.
Spectrum PDQ and Thunder video cards.

VideoSpigot, VideoSpigot Pro,
Spigot and Sound, Spigot and Sound Pro.
Radius Precision Color products, Radius Pivot, Color Pivot.
We are authorized resellers of Radius, RasterOps, and SuperMac.
Call for latest prices on video.



THIRD WAVE

1(800)880-0404

COMPARE OUR DAT DRIVES TO THEIRS.

	Third Wave DATdrive	The Other Guys
Warranty	5 years	2 years
Price: 2GB	1395.00	1399.00
Compression (8GB)	1595.00	1699.00 (only 5GB)
Firmware Upgrades	From tape	Chip replacement
Upgrade Method	User install	Vendor install
OEM	Hewlett Packard	Archive
Form factor	3.5"	3.5"
MTBF	50,000 hours	40,000 hours
Software	Retrospect	Retrospect

STORAGE SYSTEMS REMOVABLE MEDIA

OptiDisk 128	1299.00
OptiDisk 128 (SONY)	1595.00
OptiDisk 600 (SONY)	2695.00
OptiDisk 1000	3695.00
45 SR (SyQuest) w/cartridge	475.00
88 SR (SyQuest) w/cartridge	669.00
DATdrive 2GB	1395.00
DATdrive 8GB (five year warranty)	1595.00

DISK DRIVES

	INTERNAL	EXTERNAL
120 MB	449.00	539.00
240 MB	719.00	809.00
520 MB	1299.00	1399.00
650 MB	1399.00	1499.00
1000 MB	1999.00	2099.00
1300 MB	2599.00	2699.00
1700 MB	CALL	CALL



A MacWorld Favorite!

"Quietest" — March '91

"One of the best manuals" — "Highest SCSI Eval. Read/Write" — September '91

All of our DAT drives include Retrospect 1.3, one DAT cassette, one DAT cleaning cassette, and your choice of SCSI cable.

MEDIA

60 MB Tape for Teac	17.00
150 MB Tape for Teac	24.00
SyQuest 45 or 88 MB cartridge	68.00 / 115.00
DAT cassette 60 or 90 meter	17.00 / 29.00
Optical cartridge (ISO) 512 kb/sector	125.00
Optical cartridge (ISO) 1024 kb/sector	125.00
Optical cartridge for Tahiti	269.00
Optical cartridge 128 MB	49.00

SyQuest, Optical, and DAT available internally for the Quadra 950!

MEMORY UPGRADES

Third Wave manufactures a complete line of memory products for all Macs — 1, 2, 4, and 16MB SIMMs, including low profile 16MB SIMMs for the Quadra 700.

We also manufacture pseudo-static PowerBook modules to 6MB and VRAM for the LC and Quadra!

Prices change often — call for the latest!

POWERBOOK
2 MB, 4 MB,
AND 6 MB

**LC AND
QUADRA VIDEO
RAM**

**ONE, FOUR,
AND SIXTEEN
MB SIMMS**

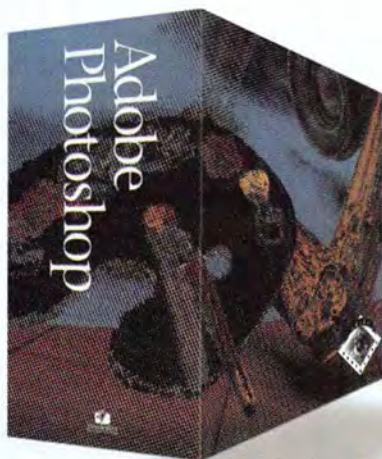


**A SPECIAL OFFER FOR
POWERBOOK OWNERS!**

**8/80 IN YOUR
POWERBOOK
FOR ONLY \$649!**

Quantum 60-80 2.5 inch
16ms internal drive with
Third Wave's 8 megabyte
PowerRAM memory module
—only \$849.00!*

A total of 80MB storage and 8MB
pseudo-static RAM! Send us your
PowerBook and we'll install it free!
*(Includes trade in of Apple 2MB module
and drive, Models 140 and 170 only.)



ADOBE PHOTOSHOP ONLY \$449!

The latest version Adobe Photoshop 2.01! This is a special offer on the full, complete version — not a bundle or limited edition version.

FEATURING



SyQuest®
REMOVABLE
TECHNOLOGY

SyQuest Drives features:

- Industry standard half-height 5.25" form factor • 20 ms average seek time • Fully embedded SCSI controller
- MTBF of 60,000 hours • SyQuest Drives include a **TWO YEAR Warranty, one cartridge & necessary cables, SCSI Director™ v.2.1 Formatting Utility** • Includes (1) 44mb & (1) 88mb cartridge
- SyQuest Cartridges carry a **ONE YEAR Warranty**

ClubMac 44mb	SQ555	\$419
ClubMac 88mb	SQ5110	\$549
ClubMac Dual 44mb		\$769
ClubMac Dual 88mb		\$999
ClubMac Dual 44mb & 88mb*		\$949
44mb Cartridge		\$64
88mb Cartridge		\$99



Quantum

Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
52mb	LPS50*	3.5" Low Profile	9ms	49mb	\$215 \$275
80mb	GoDrive 2.5"	2.5" Low Profile	16ms	80mb	\$419 \$479
105mb	LPS105*	3.5" Low Profile	9ms	100mb	\$335 \$395
120mb	LPS120	3.5" Low Profile	10ms	116mb	\$409 \$469
210mb	PRO210	3.5" Half Height	10ms	199mb	\$629 \$689
240mb	LPS240	3.5" Low Profile	10ms	234mb	\$649 \$709
425mb	LPS240	3.5" Half Height	8ms	406mb	\$959 \$1019

Quantum Drives feature:

- Ave. seek times of 25ms or less • MTBF of 100,000 - 250,000 hrs • **TWO Year Warranty**
- **NOTE:** "3.5" Low Profile, Low Power drives (25ms) for Mac Classic, LC & IIs.
- (Internal Drives: Add \$10 for Quadra 900)
- **Quantum's Go-Drive features:**
- Fast, lightweight 2.5" form factor drive designed to meet the requirements of battery-powered notebook computers • MTBF of 150,000 hours • **ONE Year Warranty, ClubMac recommends installation by an authorized dealer to preserve warranty**

Maxtor®

Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
80mb	7080	3.5" Low Profile	17ms	80mb	\$289 \$349
120mb	7120	3.5" Low Profile	15ms	121mb	\$349 \$409
207mb	LXT-213	3.5" Half Height	15ms	202mb	\$595 \$655
330mb	LXT-340	3.5" Half Height	15ms	324mb	\$969 \$1029
535mb	LXT-535	3.5" Half Height	12ms	510mb	\$1219 \$1279
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	\$1349* \$1449
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	\$1799* \$1899
1.7GIG	P1-17S	5.25" Full Height	13ms	1433mb	\$2349* \$2449

- Maxtor 3.5" Drives include a **ONE Year Warranty** • Maxtor 5.25" Drives include a **TWO Year Warranty**
- Maxtor 80 and 120 are perfect for the Mac Classic, LC and IIs.
- Internal Full Height Drives fit the Mac II, Ix & Quadra 900 only (Add \$10 for Quadra 900 Bracket)

TOSHIBA

Capacity	Model	Product Description	Internal	External
600mb	XM3301E	CD-ROM	325ms	\$519
600mb	XM3301B	Internal CD-ROM (Q900/950)	325ms	\$479
830mb	MK438FB	3.5" Half Height	12.5ms	\$1599 \$1659

Toshiba CD-ROMs include a **ONE YEAR Warranty**
Toshiba Hard drives include a **FIVE YEAR Warranty**

Visa & MC Accepted, No Surcharge • All Prices, specifications, features and system requirements subject to change without notice • Not responsible for typographical errors • All Hard drives carry a 30 day money back guarantee • Prices do not include freight • All specs are from the manufacturer. All brands and product names are trademarks or registered trademarks of their respective companies and/or owners.

FUJITSU

Unbeatable Quality and Performance

Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
330mb	M2622SA	3.5" Half Height	9ms	314mb	\$1079 \$1139
425mb	M2623SA	3.5" Half Height	9ms	405mb	\$995 \$1055
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$1199 \$1259
645mb	M2263	5.25" Full Height	16ms	640mb	\$1259 \$1359
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	\$1899 \$1999
2.0GIG	M2652SA	5.25" Full Height	11ms	1665mb	\$2995 \$3095

Fujitsu 3.5" high performance SCSI disk drives features:

- 10MB/s data transfer rate • 6.82 ms average latency • 240 KB read-ahead cache buffer

Fujitsu 5.25" high performance SCSI Winchester disk drives features:

- Embedded SCSI interface • As fast as 14.5 ms positioning time • Up to 4.8 MB/sec SCSI data transfer rate

Fujitsu drives include a **5 YEAR Limited Warranty**

Seagate

Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
420mb	ST1480N	3.5" Half Ht	14ms	406mb	\$1099 \$1159
525mb	ST1581N	5.25" Full Ht	14ms	N/A	\$1198 \$1258
320mb	ST4385N	5.25" Full Ht W-R	10.7ms	315mb	\$1249* \$1349
645mb	ST4766N	5.25" Full Ht W-6	15.5ms	632mb	\$1285* \$1385
645mb	ST4767N	5.25" Full Ht W-R II	11.9ms	634mb	\$1549* \$1649
1.2GIG	ST41200N	5.25" Full Ht W-7	15ms	989mb	\$1749* \$1849
1.6GIG	ST41651N	5.25" Full Ht W-8	15ms	1350mb	\$2169 \$2269
1.6GIG	ST41600N	5.25" Full Ht E-1	11.5ms	1307mb	\$2549* \$2649
2.1GIG	ST42100N	5.25" Full Ht W-9	12.9ms	1900mb	\$2949 \$3049
2.4GIG	ST42400N	5.25" Full Ht E-2	11ms	2050mb	\$3649 \$3749

Seagate Drives include a **ONE Year Warranty**

*Internal Full Height Drives fit the Mac II, Iix, and Quadra 900 only. (Add \$10 for Quadra 900 Bracket)

Tape Backup Systems

Bundled with **RETROSPECT (v.1.3c)**

Teac MT-2ST/N 50	155mb	\$539
WangDAT 1300XL	2.0GIG	\$1329
WangDAT 3200 DDS-DC	3-5GIG	\$1549
Exabyte 8200	2.2GIG	\$2049
Exabyte 8500	5.0GIG	\$3299
HP 2.0GIG DAT Drive (35470A)		\$1389
HP Compression DAT Drive (35480A)		\$1819

All ClubMac tape backup systems include a **ONE YEAR Warranty**, one cassette, RETROSPECT (v.1.3c) backup software, and all necessary cables.

VIDEO GRAPHIC SOLUTIONS

radius

Color Pivot/LE Bundle
\$1489

This ClubMac Bundle

combines the low cost, 15" Color Pivot/LE with Color Pivot Interface. Resolution of 624 X 832 pixel at 78 dpi. Available with NuBus, IIsi, LC, SE/30 or PowerView Interfaces.

Monitors

Color Display/21	\$3079
PrecisionColor Display/20	\$2759
PrecisionColor Display/19	\$2089
Color Pivot	\$1279
Color Pivot/LE	\$995
Monochrome Pivot Display	\$699
Full Page Display	\$579
Two Page Display/19	\$899
Two Page Display/21	\$1159

Video Boards

PrecisionColor 8, 8si Interface	\$509
PrecisionColor 8X, 8Xsi Interface	\$749
PrecisionColor 24X, 24Xsi Interface	\$1659
Color Pivot Interface (IIsi, II, LC, SE/30)	\$509
Monochrome Pivot Interface (II, LC, SE/30)	\$249
TPD Interface (IIsi, II, SE/30, SE)	\$395
PowerView	\$499

RasterOps

Color Display Adapters

RasterOps 24XLi	\$1929
RasterOps PaintBoard 24	\$1539
RasterOps PaintBoard Li	\$829
RasterOps 24Sx	\$615
RasterOps 8XLi	\$925
RasterOps 8XL	\$459
ColorBoard 264/SE30	\$685
ClearVue/GSXL	\$445

Multimedia

MediaTime	\$1539
RasterOps 24STV	\$769
RasterOps VideoTime	\$1149
RasterOps Video Expander II	\$459

Monitors

20" Trinitron	\$2315
19" Color Hitachi	\$1539
ClearVue/SD 21 (with Cable)	\$1389
21" Mono/Gray Scale	\$999
19" Mono/Gray Scale	\$769
16" Color Monitor	\$1149

SUPERMAC THE SUPERSOURCE FOR COLOR

Warranty Program
Graphic Cards • 5 Year
Graphic Displays • 3 Year

Graphic Displays

SuperMatch 20" Dual Mode Trinitron	\$2469
SuperMatch 20" Color	\$1549
SuperMatch 17" Multimode Color	\$999
21" Platinum (Black and White)	\$999
19" Platinum (black and White)	\$939

Graphic Cards

Spectrum 24 Series III	\$Call
Spectrum 8 • 24 PDQ / PDQ si	\$979
Spectrum 8 Series III	\$559
Monochrome Card	\$339

Digital Video Boards

Video Spigot (NuBus / Mac IIsi or Mac LC)	\$499 / 415
Video Spigot Pro (NuBus / Mac IIsi)	\$1335 / 1295
Spigot and Sound	\$749
Spigot and Sound Pro	\$1639



NEC

MultiSync Monitors

- Compatible with Mac LC, NuBus Family, Quadras
- Includes MAC Cable Adapter
- TWO Year Warranty

MultiSync 3FGx (15")	\$639
MultiSync 4FG (15") with AccuColor	\$759
MultiSync 5FG (17") with AccuColor	\$1359
MultiSync 6FG (21") with AccuColor	\$2799
Mac FG 8X Interface Card	\$719
Mac FG 24X Interface Card	\$1519
CDR-74 CD-ROM Gallery Bundle	\$695
CDR-37 CD-ROM Gallery Bundle	\$529

PRINTERS



NEC Silentwriter

Model 95

\$1398

- Adobe PostScript Level 2
- 300 dpi • 6 ppm • 35 fonts • 2 MB RAM, up to 5 MB
- AppleTalk, Serial, Parallel Interface
- Automatic Interface Monitoring

NEC Silentwriter2 Model 990

\$2449

- RISC Based Processor • 300 dpi • 8 ppm • 35 fonts
- Automatic Language Switching • Adobe PostScript
- 2 MB RAM, up to 4 MB
- AppleTalk, Parallel, Serial Interface, PLUS Built-in SCSI Port

Epson EPL-7500 Laser Printer

\$1995

- True Adobe PostScript
- High-speed RISC processor
- 6 ppm • 300 dpi • 35 fonts • 2 MB RAM, up to 6 MB
- Parallel, Serial, AppleTalk Interface
- 250-sheet paper tray standard

QMS -PS 410 Laser Printer

\$1495

- Emulation Sensing Processor
- 4ppm • 300 dpi • 45 fonts • 2 MB RAM, up to 6MB
- AppleTalk, Serial, Parallel Interface

ACCELERATION

DAYSTAR

DIGITAL

PowerCache

(Mac LC, SE/30, II, IIsi, ILCx†, IIsi, ILCi)

33 MHz PowerCache	\$639*
33 MHz PowerCache with 68882 math chip	\$839*
40 MHz PowerCache	\$839*
40 MHz PowerCache with 68882 math chip	\$1069*
50 MHz PowerCache	\$1299*
50 MHz PowerCache with 68882 math chip	\$1579*

†Some models of the ILCx do not provide a socket for the 68030, it is soldered into the motherboard. Price includes socket installation on the ILCx motherboard by DayStar and return shipping UPS Blue.

* Price does not include Cache Adapter Card

Cache Cards

(IIsi model includes DualPort adapter)

FastCache IIsi	\$285
FastCache IIsi with 68882 math chip	\$349
FastCache ILCi	\$255
FastCache 040 (128K cache for Quadra700 & 900)	\$345

Expansion Boards for The Mac LC and Mac IIsi

PowerMath LC	\$109
Equalizer LC (virtual memory upgrade)	\$195
Equalizer LC (includes 68882 math chip)	\$259

radius

Radius Rocket 25i	\$1219
Radius Rocket	\$1625
Radius Rocket 33	\$2030

NETWORKING

ASANTÉ

Mac LC Series Ethernet Cards

Thin/10BaseT	\$195
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Mac II Series Ethernet Cards

Thick/Thin, 16K or Thick/10BaseT, 16K	\$159
Thick/Thin, 64K or Thick/10BaseT, 64K	\$209

Mac II Series, SI Ethernet Cards

Thick/Thin/10BaseT, 64K	\$249
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Mac Plus/Classic Ethernet Adapter

SCSI Ethernet Thick/Thin/10BaseT	\$309
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Other Mac Models Available! Call!

10BaseT Hub with 12 Ports	\$499
10BaseT Hub with 8 Ports	\$249

Friendly Net Adapters

Quadra & LaserWriter IIg (Thin or 10BaseT)	\$79
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SCANNERS



MICROTEK

600ZS Color Scanner

\$1299

NOW SHIPPING WITH

Adobe Photoshop FULL Version

- Scans up to 600 dpi
- Three Scanning Passes
- 24-bit color/8-bit grayscale
- Incl. internal Apple SCSI Interface

Epson ES-300C Color Scanner

\$1249

- Scans up to 600 dpi
- Epson's TruePass Scanning System
- 24-bit color/8-bit grayscale/monochrome
- MAC, MS-DOS and NEXT Compatible
- NOW Shipping: Adobe Photoshop LE & Scantastic

Sharp JX-320 Color Scanner

\$1449

- Three Scanning Modes (Color/Grayscale-B/W)
- Scans up to 600 dpi • One-Pass Scanning
- Built-in Image Processing
- Selectable Interface (SCSI-2 or GBIP)
- NOW Shipping: Adobe Photoshop (FULL Version)

MEMORY

PowerBook 100

2MB Memory Module	\$117
4MB Memory Module	\$269
6MB Memory Module	\$425

PowerBook 140/170

2MB Memory Module	\$117
4MB Memory Module	\$195
6MB Memory Module	\$259

Macintosh Memory

1mb x 2 - 80ns (LC, LCII, IIsi, Classic II, Quadra 700 & 900)	\$29
1mb x 8 - 80ns	\$31
2mb x 8 - 80ns	\$64
4mb x 8 - 80ns	\$105
16mb x 8 - 80ns	\$499

Mac IIfx Memory

1mb x 8 - 80ns	\$38
4mb x 8 - 80ns	\$122
16mb x 8 - 80ns	\$599

Quadra Memory

Low Profile 16mb	\$589
256K VRAM	\$29

MISCELLANEOUS

3C 2400/9600 Baud Fax Modem	\$189
3C 2400 Baud Modem	\$97
(includes software & cable)	
DoveFax Desktop 24/96 Fax Modem	\$239
DoveFax Plus with Voice Mail	\$325
DoveFax Plus Int. NuBus with Voice Mail	\$269
EMAC 2400 Modem with MNP 5	\$145
PSI PowerBook Int. Fax Modem 24/48R/965	\$205
Applied Engineering	
3.5" AEHD 1.44 External Floppy Disk Drive	\$215
Keytronic Mac Pro Keyboard	\$125
Sonnet CoProcessor Card	
LC / LC II / Classic 16 MHz	\$75
LC / LC II / Classic 20 MHz	\$89
PowerBook SCSI Cable	\$35
SCSI Cable (25/50 pin or 50/50 pin)	\$10
SCSI-2 Cable	\$29

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Tech Support (714) 768-1490
24 Hour FAX (714) 768-9354

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ALL MAGIC DRIVES INCLUDE A 1 OR 2 YEAR WARRANTY
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WATT POWER SUPPLY, CABLES, AND DRIVER SOFTWARE

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DRIVES AVAILABLE, OFFERING HIGH SPEED AND
HIGH QUALITY" -MACUSER MAGAZINE JULY '90

MAGIC 128REM 3.5" OPTICAL

"THE BEST DESIGN & CONSTRUCTION FOR THE
MONEY" -MACUSER MAGAZINE JULY '92



FWB HARD DISK TOOLKIT BUNDLED WITH MAGIC HARD DRIVES

ECONOMY
INTERNAL KIT \$29

FWB TOOLKIT
INTERNAL KIT \$49

EXTERNAL KIT \$99



MAGIC HARD DRIVES

MAGIC HARD DRIVES

Magic 40MB Hard Drive*	\$199
Magic 52MB Quantum LP**	\$239
Magic 100MB Hard Drive*	\$299
Magic 105MB Quantum LP**	\$369
Magic 240MB Quantum LP**	\$699
Magic 425MB Quantum*	\$1099
Magic 600MB Wren Runner*	\$1599
Magic 1.2GB Seagate*	\$1999
Magic 1.5GB -5 Year Warranty!	\$2099

MAGIC 45R & 88R

Magic 45R SyQuest Drive**	\$449
Magic 88R SyQuest Drive**	\$499
SyQuest 45 & 88 Cartridges	\$69/\$119

MAGIC TAPE

Magic 150MB Tape Backup*	\$699
Magic 525MB Tape Backup*	\$999
Magic 600MB Tape Backup*	\$999
Magic 2.0GB DAT Backup*	\$1695
Magic 5.0-8.0GB DAT Backup*	\$1999
Magic 2.3GB 8mm Backup*	\$2895
Magic 5.0GB 8mm Backup*	\$3799

MAGIC 128 OPTICAL

Magic 128MB REM Optical*	\$1299
Magic 128MB 3.5" Cartridges	\$59

21 MB FLOPTICAL

Magic 21MB Floptical drive*	\$479
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MAGIC CD-ROM

Magic Toshiba CD-ROM Drive	\$549
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MAGIC MODEMS

MAGIC FAXMODEMS

MAGIC AFX FAXMODEM

2400bps modem. 9600 send & 4800bps receive
class 1 & Group 1,2, & 3 fax, software.....\$89

MAGIC FX FAXMODEM

2400bps modem. 9600bps send & receive
class 2 & Group 2 & 3 fax, software.....\$139

MAGIC VFX FAXMODEM

9600bps modem. 9600bps class 1 & 2, Group 2 &
3 fax, V.42bis & MNP5, software.....\$189

MAGIC VFX V.32BIS FAXMODEM

14400bps modem. 14400bps class 1 & 2, Group 2,
3, & 4 fax, V.42bis/V.32bis & MNP5.....\$289

MAGIC MODEMS

MAGIC AMX MODEM

2400bps modem. 100% Hayes compatible.....\$69

MAGIC VX MODEM

2400bps modem with compression to 9600bps.
Hardware V.42bis & MNP5.....\$139

MAGIC VX V.32 MODEM

9600bps modem with compression to 38400bps.
Hardware V.32/V.42bis & MNP5.....\$199

MAGIC VX V.32BIS MODEM

14400bps modem with compression to 57600bps.
Hardware V.32bis/V.42bis & MNP5.....\$259



ALL MAGIC MODEMS INCLUDE A
2 YEAR WARRANTY AND A 30
DAY MONEY BACK GUARANTEE



MAGIC HARD WORKING TOOLS FOR YOUR MACINTOSH

EXTERNAL
2400 BAUD
9600 BAUD
& 14400 BAUD
MODEMS &
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ADVANCED V.42BIS,
V.32BIS & MNP 5
ERROR CHECKING &
DATA COMPRESSION
CAPABILITIES

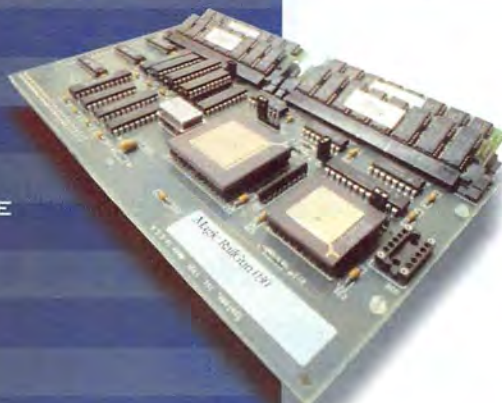
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MAGIC RAILGUN 030 ACCELERATORS FOR MAC SE, PLUS & CLASSIC.

ACCELERATORS AVAILABLE WITH BUILT-IN LARGE SCREEN VIDEO OUTPUT

MAGIC PERFORMANCE UPGRADES FOR THE MAC LC, IISI, IIci, CLASSIC II, SCSI



INCREDIBLE PERFORMANCE FROM YOUR MAC SE, PLUS, & CLASSIC

RAILGUN™ 030 SYSTEM V.S. MOBIUS 030

HARDWARE	RAILGUN 030 PRO SYSTEM	MOBIUS 030 SYSTEM
FEATURES	WITH 19" DISPLAY	WITH 19" DISPLAY
CPU SUPPORT	SE, CLASSIC, PLUS	SE, CLASSIC
PROCESSOR	25MHZ MOTOROLA 68030	25MHZ MOTOROLA 68030
MATH FPU	68882 BUILT-IN	FPU NOT INCLUDED
PMMU	BUILT INTO 68030	NOT INCLUDED
VIDEO PATH	32-BIT	16-BIT
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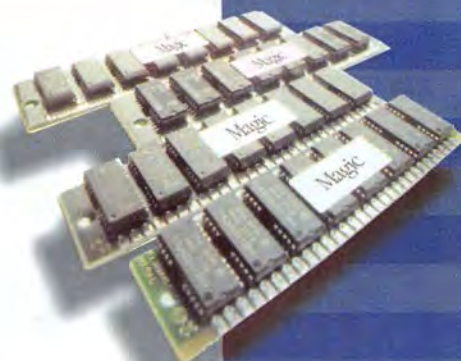
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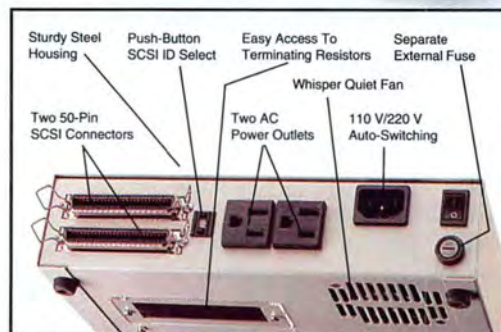
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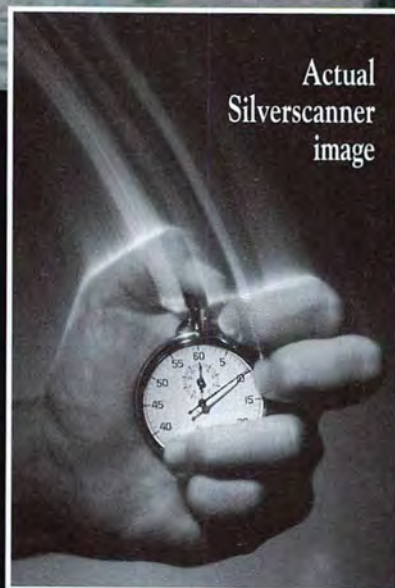
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La Cie Silverscanner
1200 dpi at 100%



Microtek 600ZS



Howtek Scanmaster 3



La Cie Silverscanner



See us at
Macworld Expo!
Bayside Expo Center
Booth #1306

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finish!

La Cie Silverscanner

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- Wide dynamic range
- Lightning fast scanning
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- FREE Silverscan™ software plug-ins



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(under 80MB)

Best
Hard
Drive!
(80-200MB)

Best
Hard
Drive!
(over 200MB)

Best
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Silverscanner

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the La Cie
Silverscanner."

Macworld, June 1991

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requires card

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Go•120	699	N/A
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120	399	479
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367-372

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391-393

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	PREMIER	CLASSIFIED	BUSINESSCARD		PREMIER	CLASSIFIED	BUSINESS CARD
HARDWARE				Religion			
Accelerator Boards	367	373		Sales Marketing			
Bar Coding		373		Scientific		389	393
CD-Rom				Security			
Communications				Shareware		389	393
Computer Systems	367	373	391	Stackware			
Data Acquisition				Statistics			
Data Recovery Services		378	391	Taxes			
Disk Drives		378		Utilities			
Diskettes				Word Processing			
General							
Input Devices	369			MISCELLANEOUS			
Insurance		379	391	Accessories	371	389	393
Memory Upgrades		379		Books/Catalogues			
Networking				Business Opportunities			
Peripherals	369	382		Consulting/Programming			393
Power Supplies		385		Data Conversion Services		389	
Printers		385		Desktop Publishing Services		390	393
Scanners	369			Diskette Copy Services		390	
Security				Furniture			
Used Equipment				Insurance			
				Novelties			
SOFTWARE				Services/Repair			393
Accounting			391	Slide Imaging Services	372	390	
Bar Coding	369	385		Supplies	372	390	
Business	370	385	391	Training			393
Business Time Management							
CAD/CAM		387		AD SALES INFORMATION			
CD-Rom	370	386		One Park Avenue, New York, NY 10016			
Communications/Networking		387		(212) 503-5115 or (800) 825-4ADS			
Desktop Publishing	370	387		ACCOUNT REPRESENTATIVES			
Educational		387	391	Sherrie M. Graddic		(212) 503-5152	
Emulation				Business Card Representative			
Engineering		387		Larry Grella		(212) 503-5138	
Entertainment/Games	370	387	391	Al, AR, IA, IL, IN, KS, KY, LA, MI, MO, MS, NE, OH, OK, TN, TX, WI, CANADA, OVERSEAS			
Financial			392	Thomas P. Koletas		(212) 503-5136	
Fonts		388		CT, DC, DE, FL, GA, MA, MD, ME, NC, NH, NJ, NY, PA, RI, SC, VA, VT, WV			
Foreign Language	371	388		Dennis M. Leavey		(212) 503-5111	
Genealogy	371	388	392	AK, CA (209, 408, 415, 510 707, 800, 805, 916), HI, ID, MN, MT, ND, NV, OR, SD, WA, WY			
General				Laura A. Salerno		(212) 503-5140	
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Graphics		388		CENTRAL ADVERTISING STAFF			
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Medical/Dental			392	Chris Meyer		Nepreil Foster	
Music/MIDI	371	389		Production Coordinator		Advertising Coordinator	
Networking							
Personal Management							
Programming Tools	371						
Public Domain		389					
Real Estate			392				
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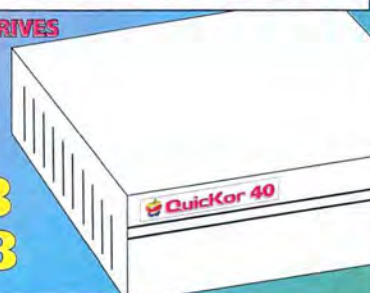
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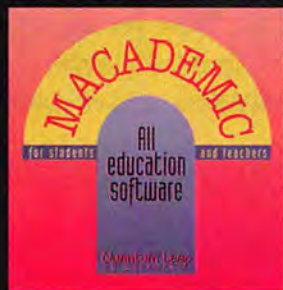
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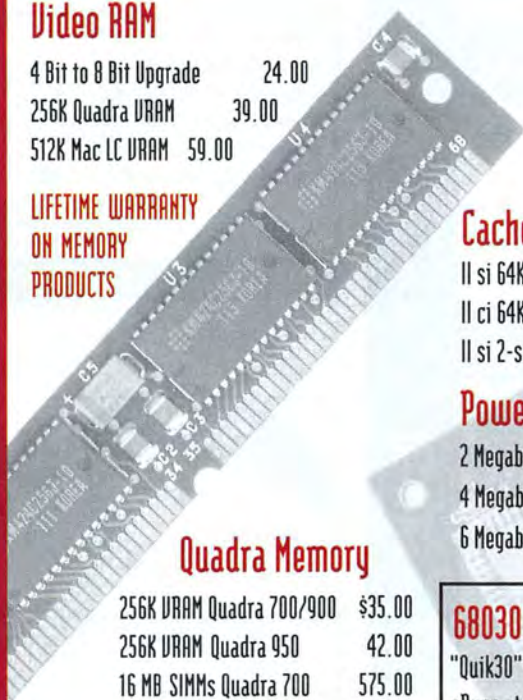
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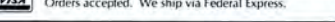
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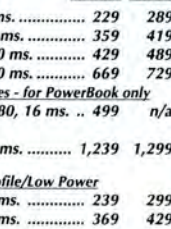
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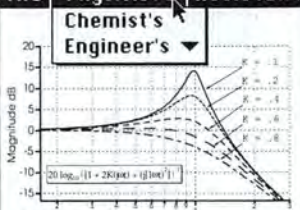


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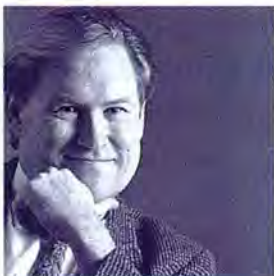
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I Sack Newton!



What costs too much, does too little, and breaks too easily? That's right, Apple Computer strikes again.



Is it just me? Or is Apple acting kind of wacky gah-gah with this new line of handheld gizmos that, according to the company, will magically produce a trillion dollars or so in sales? As this vision of the future unfolds, I'm reminded of George Bush's peculiar amazement upon sighting a bar-code reader at a grocery store. Are Sculley and crew suffering from this same Gomer Pyle mentality? *Goll-lee!*

Technology doesn't advance in sudden leaps and bounds. Bush was stunned by the laser-beamed bar-code reader because he hadn't been to a grocery store for a few decades. If you don't get out much, these "advancements" can catch you off guard. Technological advancements are always part of observable trends. True, it may be a fast-paced observable trend, but it's never so fast that it catches a normal person by surprise.

It's this last notion that makes me laugh about the failed Fifth Generation Project envisioned by the Japanese several years ago. The idea was to circumvent the current developments in computer technology and somehow leapfrog into a whole new concept. The computer scene was supposed to be catapulted overnight into some sort of who-knows-what dream world. From its inception, the idea made no sense. Developments in technology and software are closely followed by a huge contingent of scientists and engineers. Before anything important happens, everyone knows it's happening.

No important "new" technology we use today became an overnight sensation. Laser-disc technology took a long time to develop before the compact disc became a sensation. Cellular-phone systems were on the drawing boards and discussed openly for years before they found themselves in every yuppie's car. A slew of technologies are being developed, but few of them are a secret. The eventual product may be kept a mild secret, but that's as far as secrecy goes. Surely nothing could remain so secret that a Fifth Generation could suddenly emerge from a bunch of Japanese scientists shooting in the dark.

I get the feeling that Apple is suffering from the same ego-driven delusion that infected the Fifth Generation promoters.

Having said all this, I'll now complain about the Newton devices themselves. When I think of those dinky pocket contraptions, I think "junk." Sorry, but carrying around some breakable clunky little pocket computer is

just asking for trouble. I know plenty of people who do it and rave. I've tried a couple of them and have even gone so far as to seriously test that crazy Wrist Mac. Maybe someday these things will make me comfortable. For now, no.


Apple is calling these gewgaws "Newtons" because, I suspect, the device can easily be dropped (and probably as easily broken), thus reconfirming certain gravitational precepts developed by Isaac Newton. The breakability of these gadgets makes me nervous. I once broke a screen on a NEC Ultralite and have been unnerved ever since by the delicacy of portable computers. Pen-based machines are particularly freaky. First of all, these devices are expensive. Even if a pen computer sells for less than \$1,000, it's expensive.

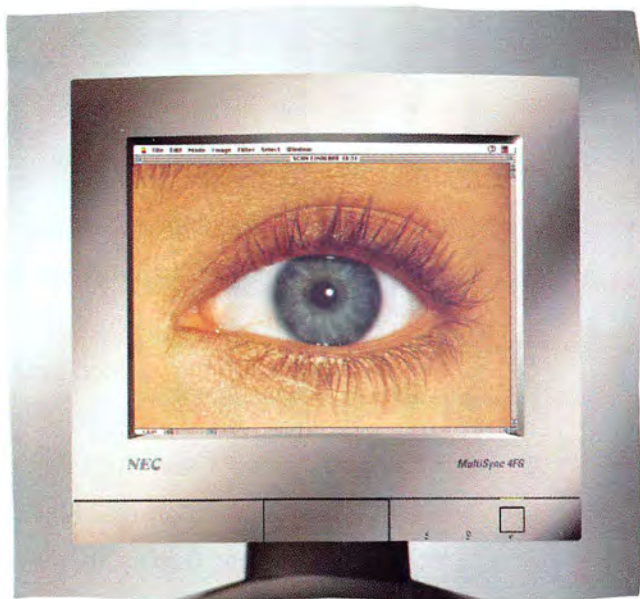
I'm amused at how the marketers tell you that something is less than \$1,000 to indicate that it's somehow inexpensive. Hey, guys, get a clue. \$2.49 is inexpensive! \$16 is inexpensive. \$995 is *expensive*. Perhaps they're comparing everything with Cray-2 prices.

Whatever the case, nobody wants to drop a \$995 Newton unless they're doing product testing on a loaner and Apple expects the machine to be returned in a parts bag. Know it: Eventually these things are going to be dropped. Who wants to pass out a few hundred of these \$995 overblown clipboards to their fumble-fingered employees? Nobody, that's who — and that's why these things will never catch on. You can barely read the screen. They'll chew up batteries like there's no tomorrow. Handwriting recognition is years away. And, finally, there are better solutions, called notepads, that cost less.

OK, it's obvious that I'm not a big fan of these things. They're too expensive, and older technologies can do the job better (ever heard of a pencil?). Taking old technologies or anything that already works well and is already inexpensive and throwing silicon technology at it is an incredible waste of technological resources.

Technologies such as portable phones add an element of convenience and efficiency to our day-to-day life, so they are a welcome improvement. A notebook computer can do most of the work of a desktop computer and is also a welcome technology. But a computerized notepad is just plain stupid.

Sorry, but I don't see the trillion dollars in sales from them. 



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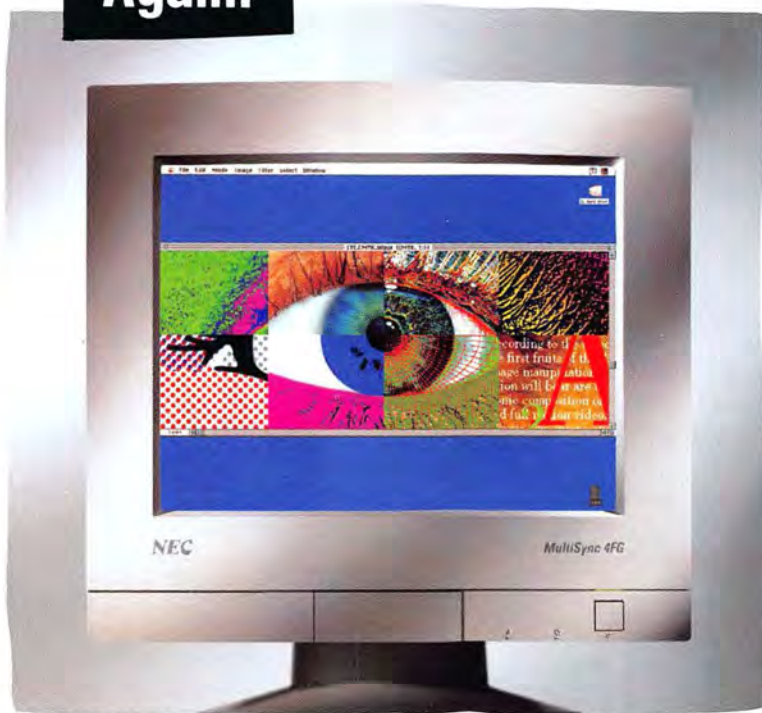
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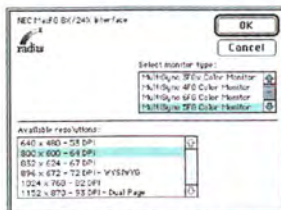
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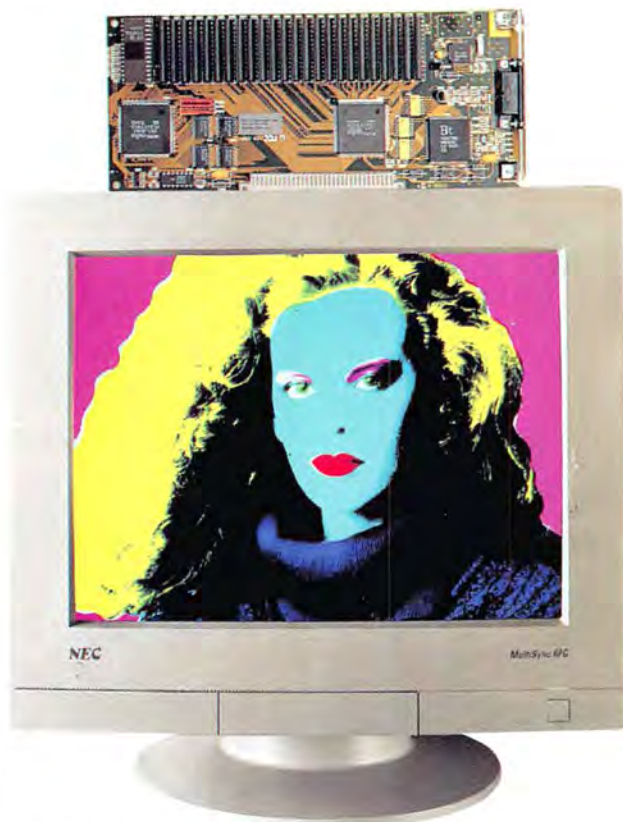
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